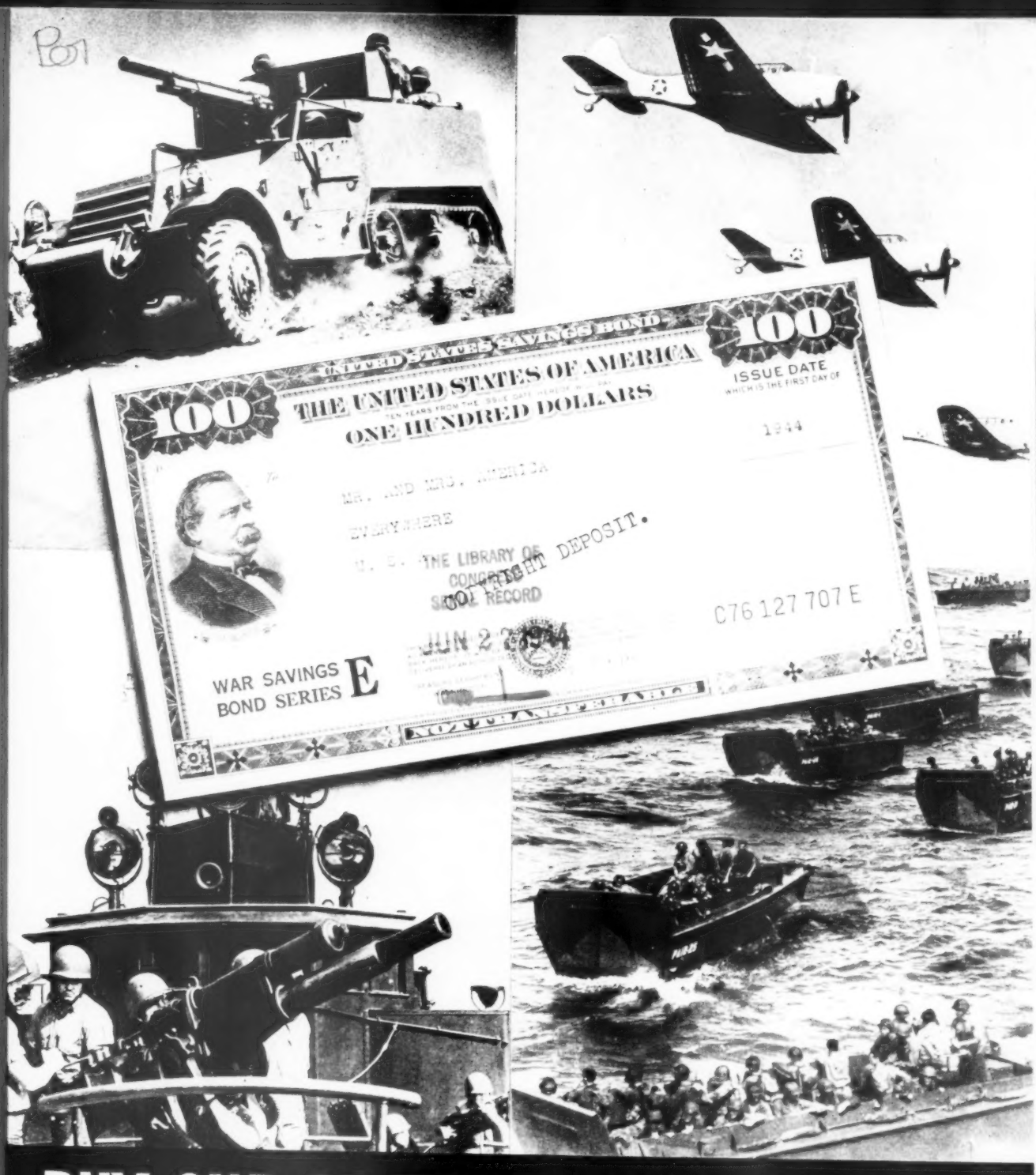
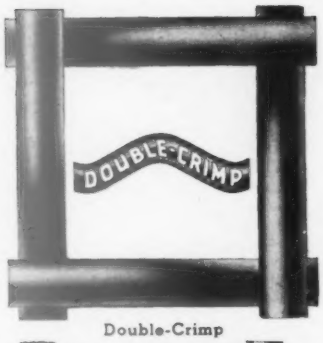


BUY ONE OF THESE BONDS TODAY !

PIT AND QUARRY JUNE, 1944

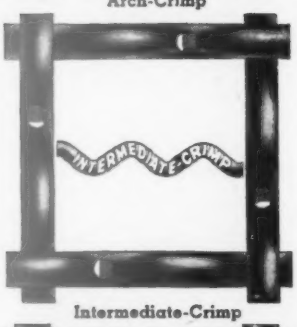
FOR 27 YEARS THE LARGEST PRODUCER CIRCULATION IN THE FIELD

JUN 26 1944

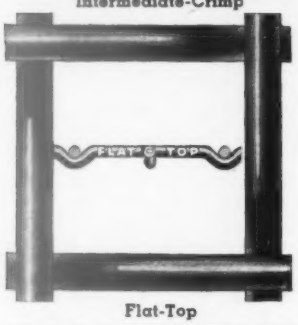


Double-Crimp

Arch-Crimp



Intermediate-Crimp



Flat-Top

"The Perfect"

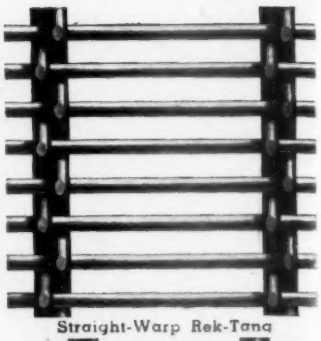
Wire Cloths and Screens

of

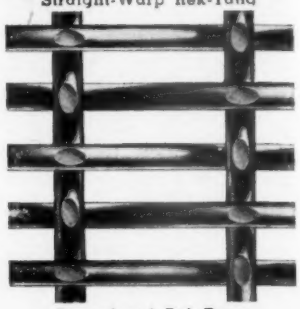
SUPER-LOY
STEEL
GALVANIZED STEEL
STAINLESS STEEL
NICKEL-CHROME STEEL
PHOSPHOR BRONZE
BRASS
COPPER
MONEL
NICKEL
ALUMINUM

•

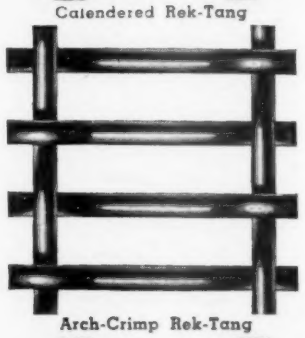
Any Special Metal for Any Service



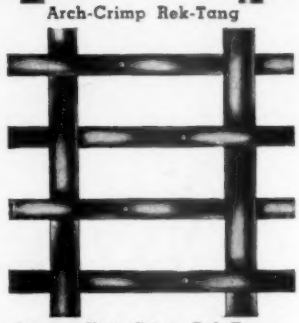
Straight-Warp Rek-Tang



Calendered Rek-Tang



Arch-Crimp Rek-Tang



Intermediate-Crimp Rek-Tang

"Perfect" WEAVES

Arch-Crimp
Coiled
Double-Crimp
Double-Fill
Dutch
Flat-Top
Intermediate-Crimp
Rek-Tang
Selvage-Edge
Straight-Warp
Stranded
Sta-Tru
Triple-Warp
Twilled
Twisted-Fill
Twisted-Warp

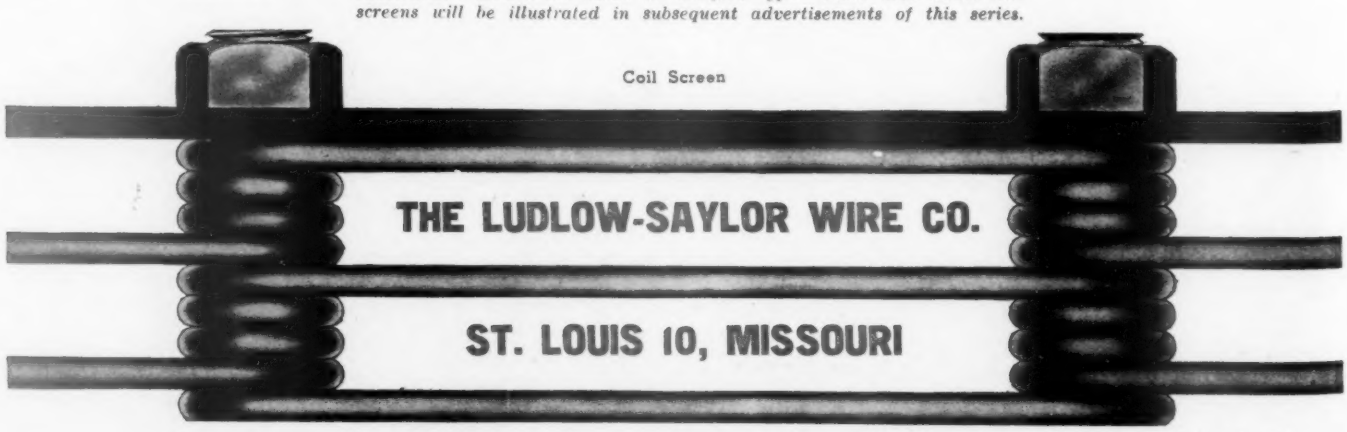
"Perfect" PROCESSING

Arc-Welding
Bending
Binding
Brazing
Calendering
Coiling
Crimping
Cutting
Dipping
Dishing
Finishing
Flanging
Flattening
Forming
Framing
Galvanizing
Jointing
Knuckling
Painting
Rolling
Selvaging
Shaping
Shearing
Slitting
Soldering
Spot-Welding
Squaring
Stitching
Tack Welding
Trimming

"Perfect" PRODUCTS

Baskets
Circles
Coils
Cones
Cylinders
Discs
Forms
Leaves
Lengths
Panels
Pieces
Ribbons
Rings
Rolls
Sections
Segments
Strips
Templates

Illustrations show items listed in bold-face type. Other wire cloths and screens will be illustrated in subsequent advertisements of this series.



Coil Screen

THE LUDLOW-SAYLOR WIRE CO.

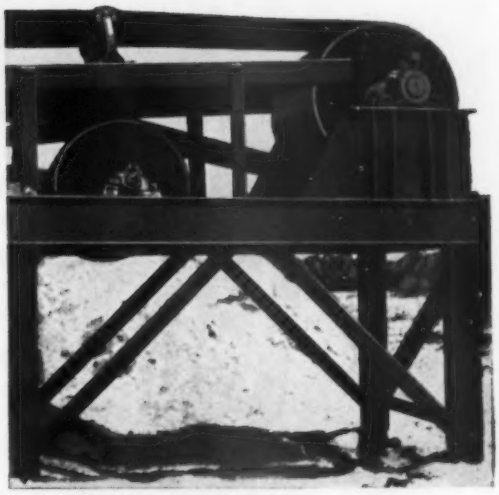
ST. LOUIS 10, MISSOURI

Efficient, High-Capacity Handling with LINK-BELT BELT CONVEYORS

You can be assured of maximum belt life, minimum power and maintenance cost, and dependable trouble-free service with Link-Belt Anti-Friction Belt Conveyor Idlers and other equipment. Link-Belt engineers pioneered in the development of anti-friction belt conveyor idlers and have consistently improved the original, fundamental design--the grease seal, bearing adjustment, shaft mounting and the supporting stands and brackets. All with the result that today's Link-Belt designs offer the very best in belt conveyor equipment.

Anderson Ranch Dam

. . . is a U.S. Bureau of Reclamation Project located on the South fork of the Boise River, approximately 71 miles from Boise, Idaho. Low cost handling of excavated material in a continuous stream, with minimum attendance and elimination of rehandling is accomplished on this job with Link-Belt Conveyors. These conveyors extend along the edge of mountains and carry earth through several tunnels from the borrow pit, located 2 miles away. They all employ Link-Belt Anti-Friction Idlers and welded steel terminal pulleys. Rubber-tread impact idlers are employed at conveyor loading points to absorb shock, and self-aligning idlers located at proper intervals along both the carrying and return runs, automatically serve to keep the conveyor belt in line.



Shasta Dam . . . All 163 end-pulleys (38″ face for 36″ wide conveyor belts) for conveyors for Shasta Dam to handle sand and gravel, were of the Link-Belt welded steel type. The picture above shows two of these in service on one of the 26 individual conveyors which make up the conveying system. All the head pulleys are rubber-lagged, 48″ diameter. Many are mounted on 5-$^{15}/_{16}$″ diameter shafts, and all are furnished with heavy-duty bearings.

LINK-BELT COMPANY

Chicago 9, Indianapolis 6, Philadelphia 40, Atlanta, Dallas 1, Minneapolis 5, San Francisco 24, Toronto 8. Offices, Factory Branch Stores and distributors in principal cities.

LINK-BELT

BELT CONVEYOR EQUIPMENT

IDLERS • TRIPPERS • BELTS • PULLEYS • BEARINGS • DRIVES

9497

PIT AND QUARRY, June, 1944, Vol. 36, No. 12. Published monthly by the Complete Service Publishing Company, 538 South Clark Street, Chicago 5, Ill. Subscription price $2 for 1 year in the U. S. and possessions, Canada, Central and South America; elsewhere $1 additional for each year. Single copies 25 cents. Entered as second-class matter February 28, 1932, at the Post Office at Chicago, Ill., under the Act of March 3, 1897.

What makes this Upson-Walton Turnbuckle a better Turnbuckle

BUYING a turnbuckle is like buying a steak . . . or a watch . . . or a hammer—or anything! Exercise good buying judgment and you can always get something better.

Upson-Walton turnbuckles are *better turnbuckles*—and *better buys*—because of specific refinements in design and engineering initiated by this three-quarter-century old, modern company.

If you are using another make of turnbuckle now, check it against this partial list of Upson-Walton specifications.

- **The bodies** *of Upson-Walton turnbuckles are made in closed dies for uniformity—a 12" Upson-Walton turnbuckle always gives 12" of take-up.*
- **All Upson-Walton** *bodies and fittings are straightened after forging to insure a true thread and permit the turnbuckle to develop maximum strength.*
- **The body reins** *of all Upson-Walton turnbuckles are wider than the shank diameter—affording protection for the threads.*
- **Reins** *are constructed with ample section and rigidity, so that a bar may be safely inserted to set up tension.*
- **All Upson-Walton** *turnbuckles are designed so that heads have a full hex —a wrench can be applied on any pair of flats and have full bearing.*

U-W

Established 1871

AS WE GO TO PRESS, DELIVERIES ON UPSON-WALTON TURNBUCKLES ARE GOOD.

THE UPSON-WALTON COMPANY

Manufacturers of Wire Rope, Wire Rope Fittings, Tackle Blocks

NEW YORK • PITTSBURGH • CLEVELAND • BUFFALO • CHICAGO

Diesel Power on the March

HERE'S an idea that's working now in Russia. It may provide emergency electric power in conquered lands and liberated countries all over the world.

For the Soviet, Cooper-Bessemer built powerful Diesel engines, to run efficiently under most difficult field conditions. Each is coupled to a dynamo, designed for easy moving. As Russia's victorious armies drive the Nazis back and desolated districts are recovered, these big power units move in. At once, they can supply badly needed electric power for military and civilian requirements. They need only fuel oil to operate.

Diesel engines by Cooper-Bessemer are the heavy-duty long-lasting type, built to do tough jobs—on shipboard, in locomotives, in cities, in the desert, at remote mines, in the oil fields—driving compressors, generators or pumps. They fill thousands of vital war jobs now, will serve in thousands of hard jobs of world reconstruction.

THE Cooper-Bessemer CORPORATION

Mt. Vernon, Ohio • Grove City, Pa.

BUILDERS OF DEPENDABLE ENGINES FOR 110 YEARS

Here are

5 TYPES of GATES V-Belts

-Which Type Best Fits YOUR Needs?

446

Your Gates *FIELD ENGINEER* Can Tell You *PHONE* Him *TODAY!*

Whenever a drive in your plant is wearing out belts faster than it should—or is giving any other trouble—just pick up your phone and call the Gates Field Engineer.

He can quickly analyze your problem and, in most cases, he can correct the trouble very easily without needing to specify the use of any special-structure belts.

In some installations, however, belts having special characteristics will prove to be the most efficient and economical that you can use. For example, a V-belt with tension members composed of rayon cords will, in some installations, have advantages over the standard cotton cord construction.

Again, Static-Safety V-belts may best fit your special needs—or V-belts with tension members composed of flexible steel cables may be the most efficient and economical despite their higher initial cost.

Outstandingly, the Gates synthetic rubber V-belt—which has been in extensive use for more than 6 years now—is piling up amazing service records. Under severe conditions of oil and heat, the Gates special synthetic belt actually wears 2 times to 3 times as long as any natural rubber belt!

To find out which particular type of V-belt will serve YOU best involves no more effort than merely picking up your telephone directory and calling the number there listed for your Gates Field Engineer. He will know the type of V-belt it will pay you best to use—and he will always recommend the practice that will be most efficient and economical for you.

THE GATES RUBBER COMPANY

Engineering Offices and Stocks in All Large Industrial Centers

GATES VULCO ROPE DRIVES

CHICAGO, ILL. 549 West Washington
NEW YORK CITY 215-219 Fourth Avenue
ATLANTA, GA. 738 C & S National Bank Building
LOS ANGELES, CAL. 2240 East Washington Boulevard
DENVER, COLO. 999 South Broadway
DETROIT, MICH. 8663 Grand River Avenue
PORTLAND, ORE. 333 N. W. 5th Avenue
DALLAS, TEXAS 2213 Griffin Street
SAN FRANCISCO, CAL. 1090 Bryant Street

Better all-round job efficiency——Lower maintenance costs

with

Gulf Quality Lubricants & Fuels!

★ Wilmer Pierson has a $1,000,000 earth-moving contract on the Industrial Express Highway project near Detroit, Michigan. This will be an elevated highway running from the Ford plant in Dearborn to the Willow Run bomber plant at Ypsilanti. The Pierson part of the job is well ahead of schedule.

"Right from the start of this job we have steered clear of mechanical troubles and obtained top performance from our equipment by using Gulf lubricants and fuels," says the contractor on this highway project.★ "Our experience with Gulf products adds up to better all-round job efficiency and lower maintenance costs."

Leading contractors on all types of earth-moving jobs depend on Gulf quality lubricants and fuels to help them beat contract schedules. For they know that proper lubrication and efficient fuel performance result in fewer delays from mechanical troubles, longer service life for equipment, and less expense for maintenance.

Call in a Gulf Service Engineer today and ask him to check over your equipment. He will recommend lubricants and fuels best suited to your particular equipment and operating conditions.

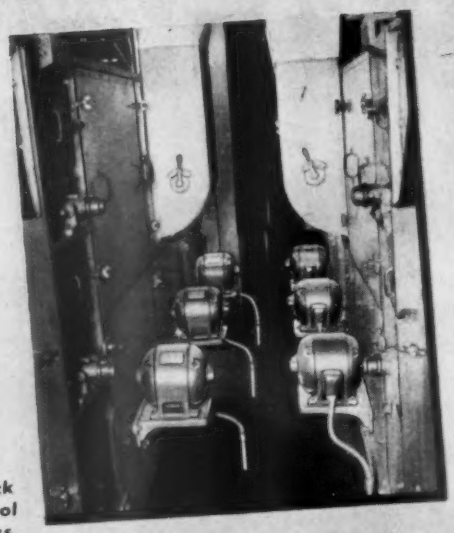
The services of a Gulf Engineer—and the Gulf line of more than 400 quality products—are available to you through 1200 warehouses located in 30 states from Maine to New Mexico. Write, wire, or phone your nearest Gulf office.

GULF

GULF OIL CORPORATION
GULF REFINING COMPANY
GULF BUILDING, PITTSBURGH 30, PA.

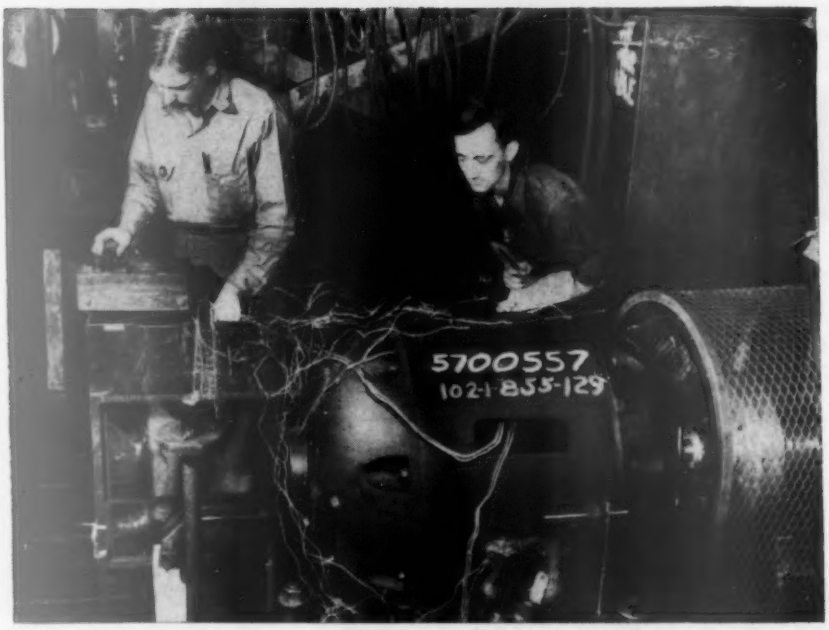
WHEN THE HEAT'S ON

Motor-driven machinery is often called upon to operate under conditions of extreme heat and humidity. For example, the motors on this wool-plant washer must operate in an air temperature of 100° F., with humidity higher than 80 per cent. Conditions like this would shorten the life of any motor lacking effective, performance-tested ventilation design. The double-end cooling system of the Tri-Clad motor helps offset the effects of high ambient temperatures common to heaters, dryers, and many ventilating-fan applications. In addition, motor windings of Formex wire (Class A insulation) are unusually long-lived under total temperatures (ambient plus rise) up to 194 F. For even higher temperatures, Class B insulation offers still greater protection.



G-E Tri-Clad motors applied to Sargent back washers at plant of the Southwell Wool Combing Company, No. Chelmsford, Mass.

Multi-Point Tests on TRI/CLAD Motors Tell Temperature Conditions Inside and Out



Dozens of thermo-couples and thermometers at all vital points of this Tri-Clad motor reveal temperatures under a wide range of load conditions. First, tests like this helped to perfect the double-end ventilation design. Now regular tests of Tri-Clad motors taken off the production line verify previously established temperature-rise limits, and ability of insulation to stand up. Continued research along the same lines, including operation in enclosures which restrict air flow, points the way to further improvements in the future. *General Electric Company, Schenectady 5, N. Y.*

GENERAL ELECTRIC

TRI/CLAD MOTORS

Every week 192,000 G-E employees purchase more than a million dollars' worth of War Bonds.

Type "K" JAW CRUSHER

NEW! —A BIG MONEY MAKER!

WE BUILD

Rotary Kilns
Rotary Coolers
Rotary Dryers
Rotary Slakers
Scrubbers
Evaporators
Jaw Crushers
Gyratory Crushers
Reduction Crushers
Crushing Rolls
Grinding Mills
Ball Mills
Rod Mills
Tube Mills
Pug Mills
Wash Mills
Feeders
Rotary Screens
Elevators

This new Traylor Type K Jaw Crusher combines the salient features of the well known Blake breaker with improvements that make it a modern, quick money maker for the days of sharp competition that lie just ahead.

FEATURES: Meehanite metal Frame, of scientifically reinforced design, with Pitman Shaft Bearings cast integral; cast steel Swing Jaw; two-piece cast steel Pitman; patented (U. S. Pat. No. 2,210,790) Swing Jaw Suspension; patented (U. S. Pat. No. 1,837,102; Canadian 324,195) smooth faced Curved Jaw Plates, of manganese steel.

SIZES: Made in sizes 8" x 12"—4 T.P.H. to ⅞"; 10" x 16"—10 T.P.H. to ⅞"; 10" x 20"—12 T.P.H. to 1"; 15" x 24"—21 T.P.H. to 1⅛"; 15" x 30"—29 T.P.H. to 1¼"; 18" x 36"—46 T.P.H. to 1½"; 24" x 36"—68 T.P.H. to 1¾"; 30" x 42"—112 T.P.H. to 2". Capacities shown are only for the smallest sizes. Note how unusually small these sizes are as compared with other makes of jaw crushers of the same size. The complete range is 4 T.P.H. to ⅞" to 275 T.P.H. to 6", from the smallest product of the smallest (8" x 12") crusher to the largest product of the largest (30" x 42") crusher. Power required for fine crushing (30" x 42" size) runs as low as .88 H.P.T. and the average for all sizes in the whole range is .96 H.P.T.

Write for details of this crusher!

TRAYLOR

ENGINEERING & MANUFACTURING CO.

MAIN OFFICE AND WORKS — ALLENTOWN. PENNA., U.S.A.

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B. C. EQUIPMENT CO., LTD. 551 Howe St., Vancouver, B. C.

Export Department — 104 Pearl St., New York City. Foreign Sales Agencies: London, Lima, Rio de Janeiro, Buenos Aires, Santiago, Antofagasta, Oruro, Montevideo.

Listen, wire rope users....
HAVE YOU TRIED TO GET TIGER BRAND...LATELY?
When America was plunged into war, we were asked to put practically our entire wire rope production at the service of Uncle Sam. For good wire rope, in enormous quantities, was urgently required for military use.
As a result, we have had to disappoint some of our customers. They were prompt to realize that it was not only a case of military necessity but to their ultimate advantage to stand aside for the time being. We are grateful for their cooperation.
Although enormous tonnages of Tiger Brand are still going to our fighting men and to our Allies, a steadily growing quantity is being made available for use here at home. So, when you need good wire rope, give us a call. The chances are becoming increasingly better that we may be able to supply you with your old favorite, American Tiger Brand—today even a better product because of its war service.
Excellay Preformed
AMERICAN TIGER BRAND WIRE ROPE
AMERICAN STEEL & WIRE COMPANY
Cleveland, Chicago and New York
COLUMBIA STEEL COMPANY
San Francisco
United States Steel Export Company, New York
USS
UNITED STATES STEEL

MORE POWER...
TO YOUR POSTWAR PLANS!

Count on Hendy Diesels for heavy-duty power in a wide variety of postwar jobs...as well as in wartime activities...because these modern engines include 22 design and construction features that contribute to lower operating and maintenance cost. All these engineering and metallurgical developments are combined for the first time in a single engine.

When you install a Hendy Diesel you have a power plant designed with fewer working parts so that maintenance costs are lower... with accurate temperature control to reduce fuel and lube oil consumption...built with full strength yet lighter weight...by an organization that has designed and manufactured power plants for more than half a century.

GENERAL SPECIFICATIONS—Series "50"; 4 Cycle; Bore 12"; Stroke 15". Rated Power at 450 rpm. 75 hp. per cylinder. Available with reduction gears and power take-off to meet special conditions.

Complete data on the Hendy Series "50" Diesel Engines is available at the nearest Hendy Branch office.

TOMORROW'S DIESEL TODAY

EST. 1856

28-0-4-V

JOSHUA HENDY Division
JOSHUA HENDY IRON WORKS
SUNNYVALE, CALIFORNIA

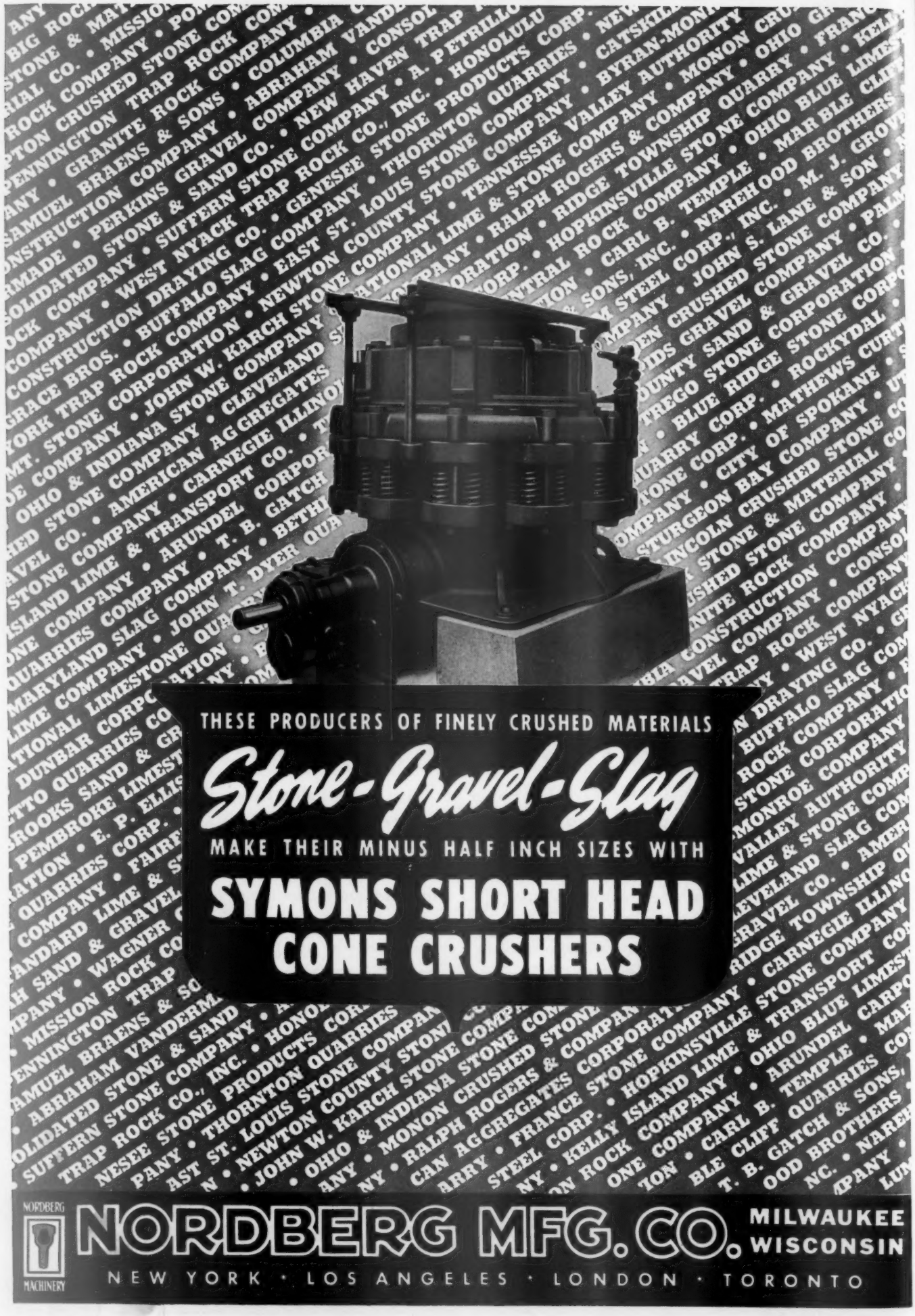
Branch Offices: BOSTON • BUFFALO • CHICAGO • CINCINNATI • CLEVELAND • DETROIT • NEW YORK • PHILADELPHIA • PITTSBURGH • SAN FRANCISCO • ST. LOUIS • WASHINGTON • LOS ANGELES

TURBO-GENERATORS

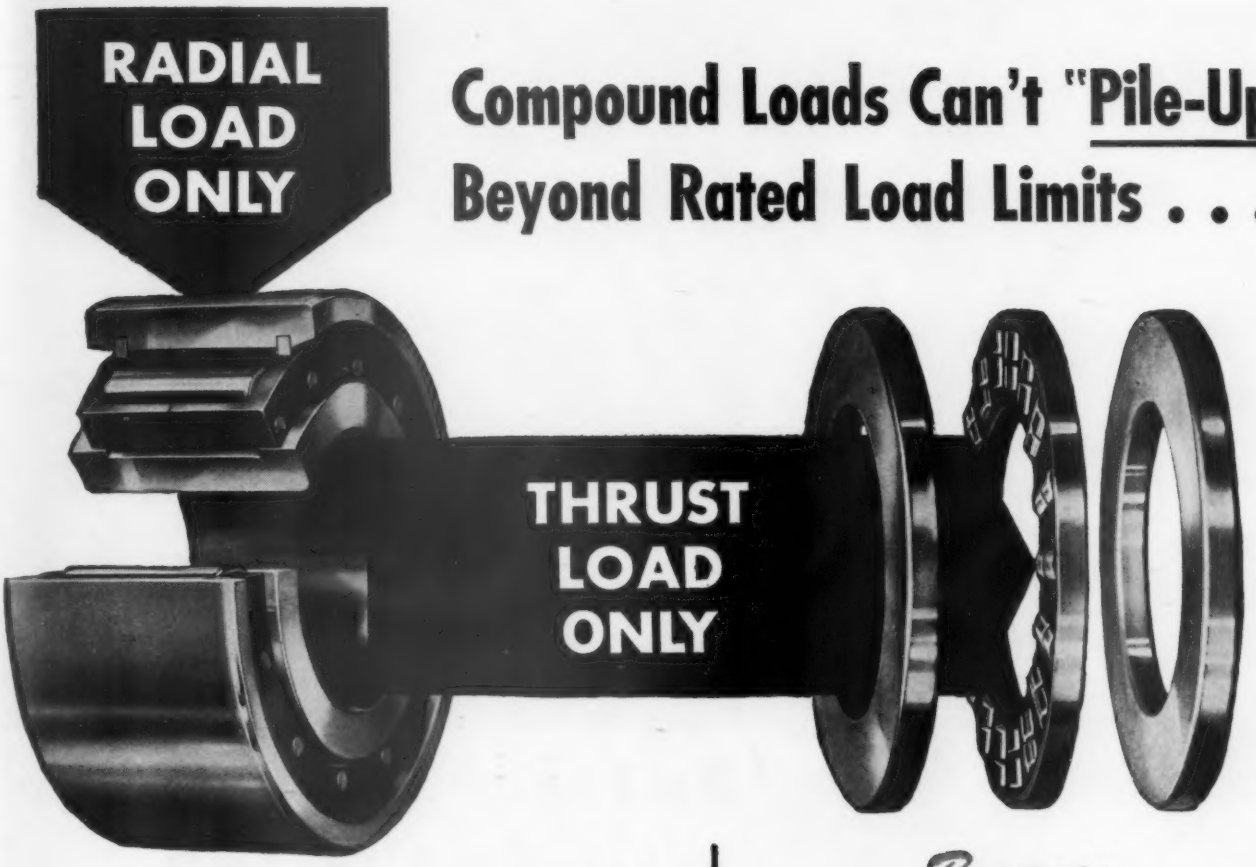
REDUCTION GEARS

STEAM TURBINES

DIESEL ENGINES


THESE PRODUCERS OF FINELY CRUSHED MATERIALS
Stone-Gravel-Slag
MAKE THEIR MINUS HALF INCH SIZES WITH
SYMONS SHORT HEAD CONE CRUSHERS
NORDBERG MACHINERY
NORDBERG MFG. CO.
MILWAUKEE WISCONSIN
NEW YORK · LOS ANGELES · LONDON · TORONTO

Compound Loads Can't "Pile-Up" Beyond Rated Load Limits . . .



You never have to worry about combined radial and thrust loads piling up on a single bearing when installing Rollway Roller Bearings. Because with Rollway's right-angle loading, there just isn't any such thing—a radial bearing carries the radial load, and a thrust bearing carries the thrust load. Or, if there's just one load—either radial or thrust—you use just one bearing. It's as simple as that.

Naturally, the magnitude of either the thrust or radial load component is smaller than the combined magnitudes of the two. Thus, you get a capacity margin you frequently can use either for a heavier load, a higher shaft speed, a longer life expectancy, or a proportionate combination of all three. Or you can cut down on the size of the housing and use a smaller size bearing. Whichever you choose to do, you'll find that Rollway gives you a better run for your money . . . that it simplifies and standardizes your bearing problems.

Because

ROLLWAY RIGHT ANGLE LOADING Splits the Load

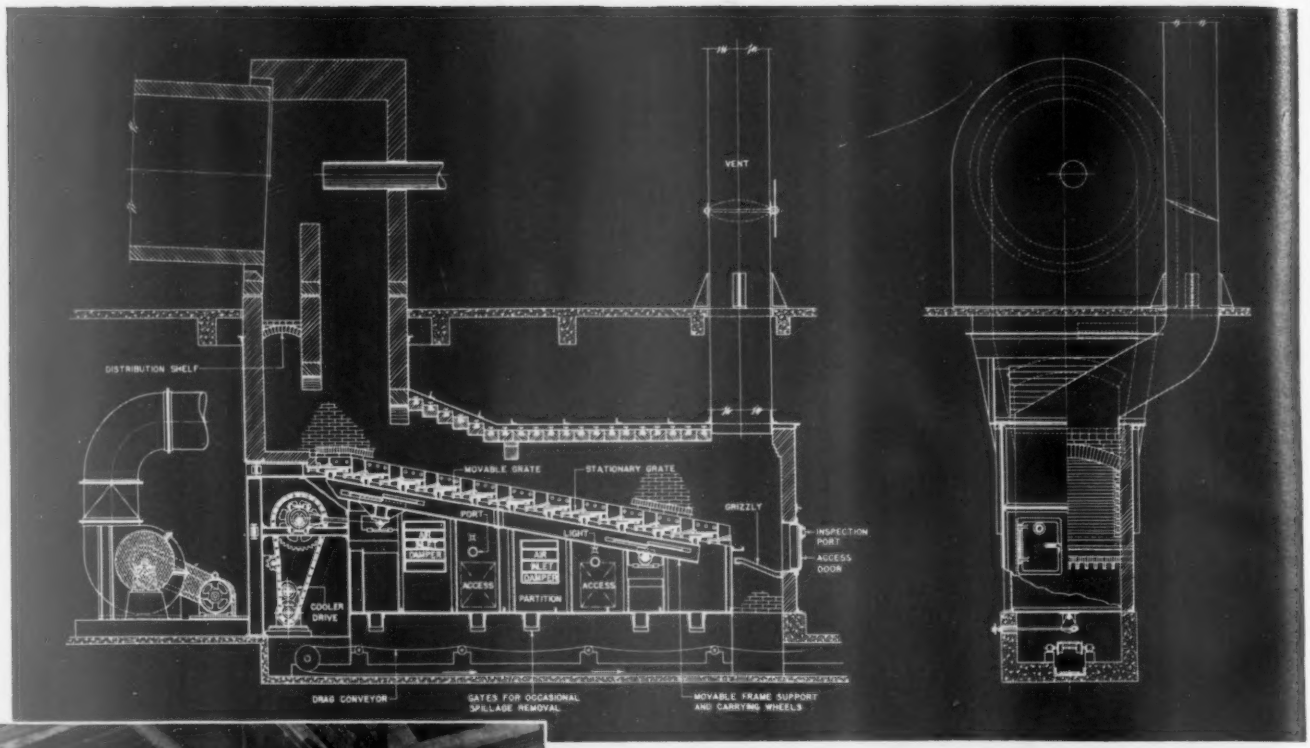
into pure radial and pure thrust

STANDARD SIZES FOR MOST APPLICATIONS

S.A.E. or American Standard metric dimensions and tolerances in a wide range of sizes and types assures low cost and ready availability for most applications. Let our engineers assist you in selecting the types best suited to your needs. No charge or obligation. Just send drawing or detailed description.

ROLLWAY BEARING COMPANY, INC., SYRACUSE, NEW YORK

BUILDING HEAVY-DUTY BEARINGS SINCE 1908 **BEARINGS**



Fuller Coolers Will do the Job Better . . .

Satisfactory performance of initial installations has resulted in many repeat orders . . . proof that Fuller Coolers do the job better . . . that they do everything claimed for them, meeting the exacting approval of the chemical and operating departments of the many companies making these installations.

Since the first trial unit proved successful, sales have consistently mounted, until today more than 100 have been sold. And, of this impressive total, 23 have been repeat orders.

Our engineering department is now in a position to make studies of your requirements. Why not act now . . . be prepared to install Fuller Coolers at the first opportunity.

FULLER COMPANY

CATASAUQUA, PENNSYLVANIA

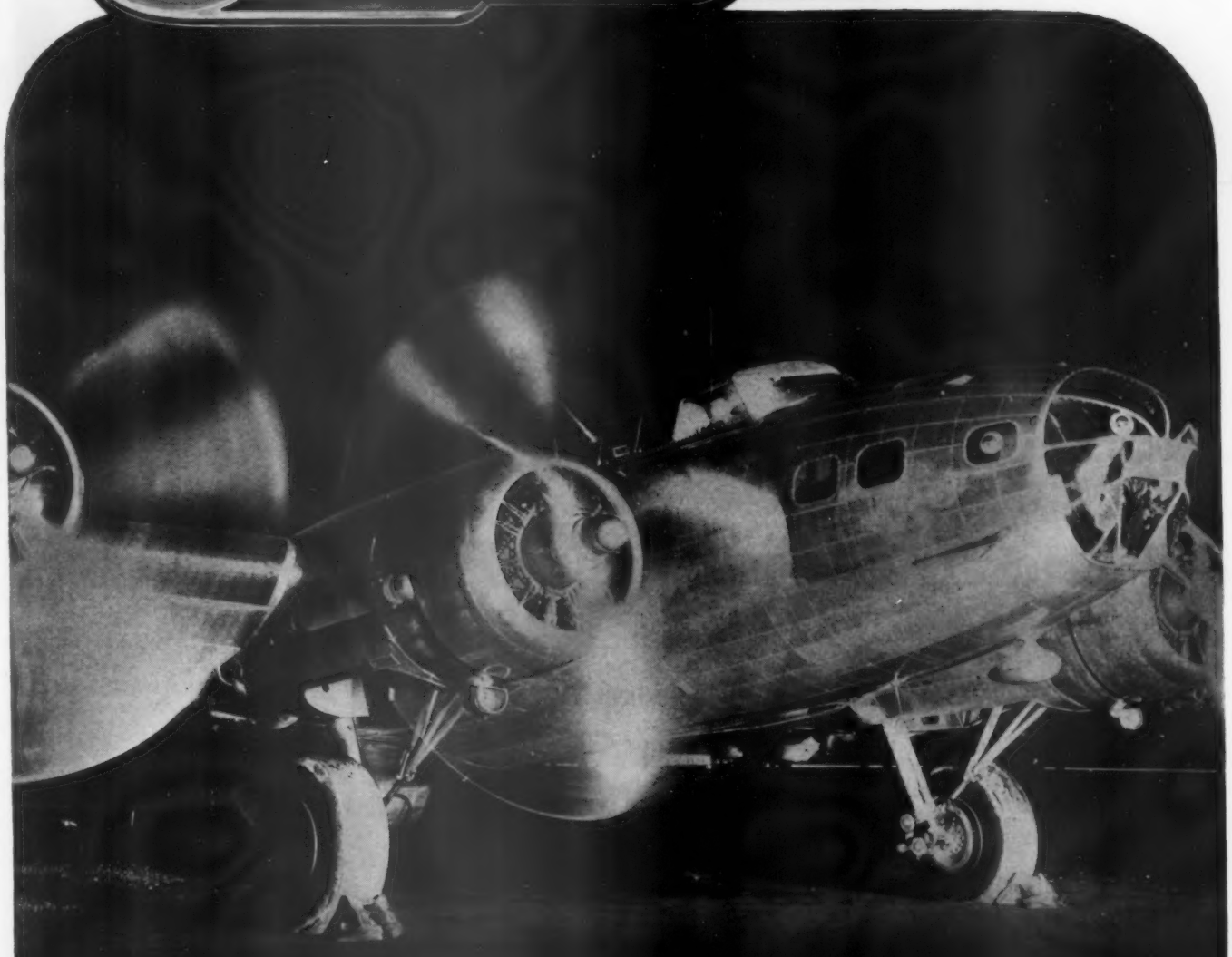
Chicago 3 : 1144 Marquette Bldg.
San Francisco 4 : 421 Chancery Bldg.
Washington 5, D. C. : 618 Colorado Bldg.

CO-13

FULLER COMPANY

FULLER-KINYON, FULLER-FLUXO AND THE AIRVEYOR CONVEYING SYSTEMS . . . ROTARY FEEDERS AND DISCHARGE GATES . . . ROTARY AIR COMPRESSORS AND VACUUM PUMPS . . . AIR-QUENCHING COOLERS . . . DRY PULVERIZED-MATERIAL COOLERS . . . MATERIAL-LEVEL INDICATORS . . . SLURRY VALVES

AIR PLUS JAEGER COMPRESSOR



We are producing for Uncle Sam today the compressor you'll demand tomorrow . . . built to the micro-precision of fine aircraft motors

Courtesy AVIATION

"AIR PLUS" Jaeger Vertical Two-Stage, Air-Cooled Compressors, in sizes from 60 to 500 ft., will be available to help you win your battles tomorrow.

THE JAEGER MACHINE CO., COLUMBUS 16, OHIO

JAEGER *Engineered* **EQUIPMENT**

"AIR-PLUS" 2-STAGE AIR-COOLED COMPRESSORS, 60 TO 500 FT.—"FLEET-FOOT" CRANE-LOADERS—"SURE PRIME" CENTRIFUGAL PUMPS—"SPEEDLINE" BUILDING MIXERS—"DUAL-MIX" TRUCK MIXERS—"JAEGER" HOISTING ENGINES AND TOWERS—"JAEGER-LAKEWOOD" PAVING EQUIPMENT

NOW IN PRODUCTION..

New Mack Trucks for Civilian Pool:

Because of urgent and mounting essential civilian needs, the War Production Board has authorized the manufacture of certain types of trucks for commercial use.

Assigned to Mack are models ranging from 9,000 pounds gross vehicle weight up to the largest off-highway vehicle. Production on some models has already started.

Military production continues, of course, in all Mack plants.

We will gladly give you detailed information. Just drop us a line, or phone.

Mack

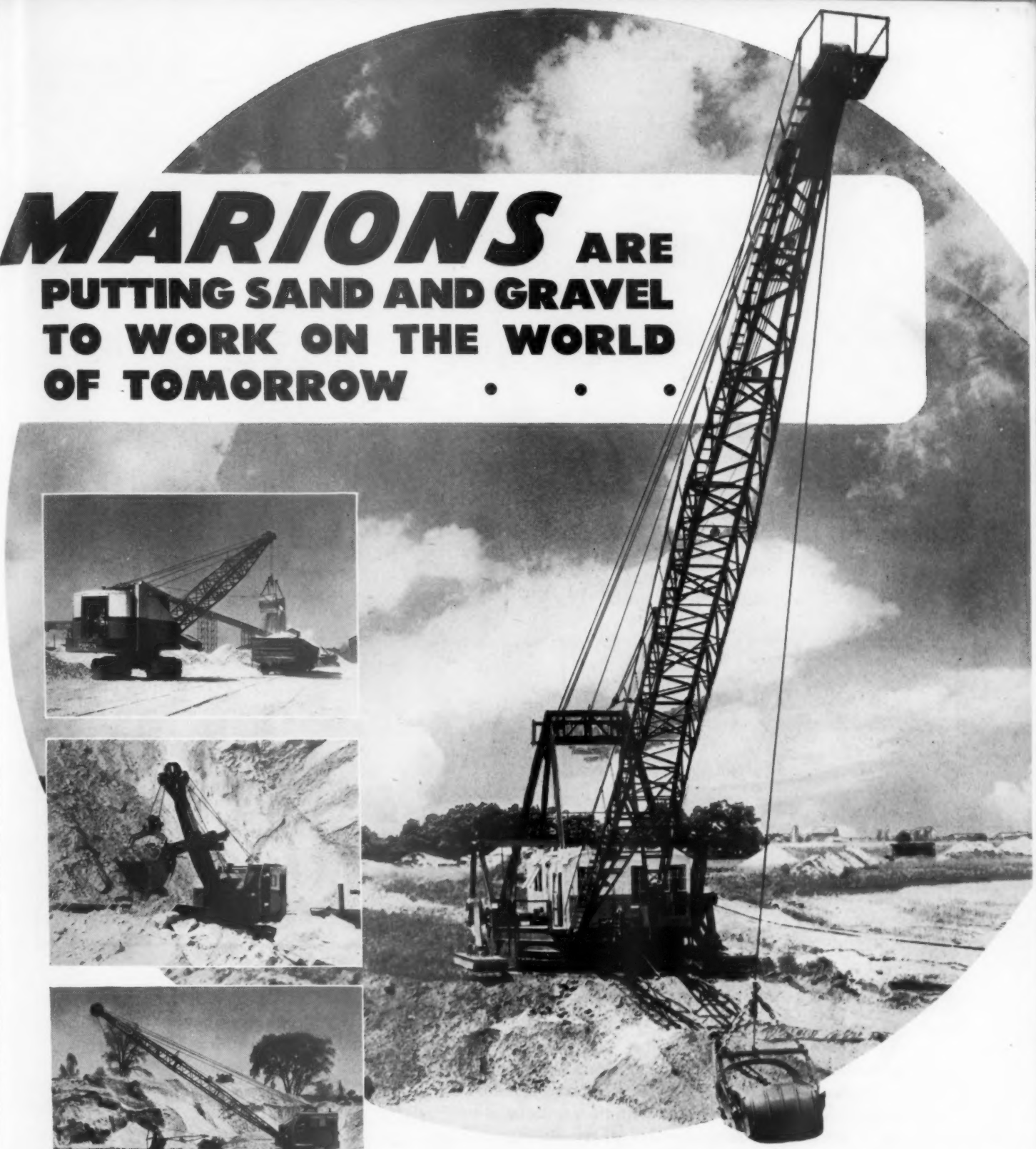
TRUCKS
FOR EVERY PURPOSE
ONE TON TO FORTY-FIVE TONS

BUY U. S. WAR BONDS

Mack Trucks, Inc., Empire State Building, New York, N. Y.
Factories at Allentown, Pa.; Plainfield, N. J.;
New Brunswick, N. J. Factory branches and dealers
in all principal cities for service and parts.

IF YOU'VE GOT A MACK, YOU'RE LUCKY...
IF YOU PLAN TO GET ONE, YOU'RE WISE!

MARIONS ARE PUTTING SAND AND GRAVEL TO WORK ON THE WORLD OF TOMORROW . . .



CRANES ★ PULL-SHOVELS
CLAMSHELLS ★ SHOVELS
DRAGLINES ★ WALKERS

For Every Material Handling Job
3/4 cu. yd. to 35 cu. yds.

BUY WAR BONDS

Big plans for the future are being built around the Nation's store of sand and gravel. These plans call for MARION shovels, draglines and clamshells to play their usual leading role in the digging and loading of these aggregates faster and cheaper. New buildings, airports, super-highways, dams, harbor facilities and housing projects, which will comprise the world of tomorrow, will come into being through Marion's part in providing THE MACHINE OF TOMORROW to handle the necessary aggregates. What are your plans for post-war construction, mining or quarrying? Let's discuss them.

THE MARION STEAM SHOVEL CO., Marion, OHIO

"BUY MORE THAN BEFORE IN THE 5TH WAR LOAN"

Exide Batteries for faster Diesel cranking

DEVELOPMENT and refinement improvements that have been made in high-speed Diesels have been matched, step-for-step, by Exide engineers. An Exide Battery recommended for a specific cranking job can be selected with the same assurance of satisfaction under all conditions as can the engine itself.

In "Off-the-highway" operations, in every industry, you will find many Exide Heavy-Duty Batteries. They are specifically designed to give peak performance in any climate and you will find them in use all over the world. Day after day, even under adverse conditions, you can depend on Exides for faster cranking. They are durable and dependable, built for long-life, and are simple to maintain.

Write for a FREE copy of the Exide catalog on Heavy-Duty Batteries. It gives you catalog data on how to order and how to get the most from your Exide Heavy-Duty Batteries.

THE ELECTRIC STORAGE BATTERY CO.
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HEAVY DUTY
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Pioneers for 50 Years

For half a century, The Cleveland Pneumatic Tool Company has devoted itself to serving many major industries.* Skilled technicians and experienced engineers within our organization have pioneered and perfected many products for each of these fields. Thus initiative and resourcefulness have enabled us to keep abreast of this country's remarkable industrial progress . . . We are commemorating our golden anniversary by continuing to put all our talents and energies in the fight to preserve the American way of life. We are proud to have grown with our nation for 50 years, and look forward to serving in the great future that lies ahead.

Buy U. S. War Bonds and Stamps

**CLECO Pneumatic Tools speed production in metal-working plants. AEROLS (the shock absorbing landing gear used so universally on aircraft) insure safe, smooth landings and take-offs. CLEVELAND Rock Drills are widely used in the mining and contracting fields. CLE-AIR Shock Absorbers protect buses, trucks and trailers from road shocks.*

THE CLEVELAND PNEUMATIC TOOL COMPANY
AND SUBSIDIARIES
THE CLEVELAND ROCK DRILL DIVISION — CLEVELAND PNEUMATIC AEROL, INC.
CLEVELAND PNEUMATIC TOOL COMPANY OF CANADA, LTD.

YOUR NEXT CRUSHER

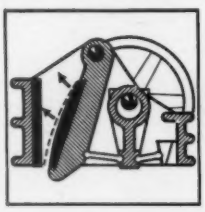
WILL IT HAVE THESE FEATURES?

Crushing Without Abrasion • Perfect Balance • Big Reduction Ratio • Large Capacity per Horsepower • Sealed, Dirt Free Lubrication • Simple, Positive Safety Device

LET'S SEE WHY OTHER CRUSHERS MUST HAVE SMALL REDUCTION RATIOS

In the Blake type crusher the single movable jaw must travel a considerable distance at the bottom to give enough crushing motion at the top. This long travel, plus the fact that it is an unbalanced machine, limits the speed at which this type can operate. The long, slow stroke lets large rocks fall thru when the jaws are in the open position. Obviously, this machine can never crush fine.

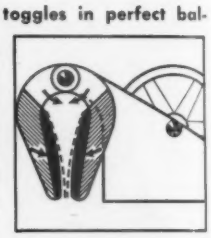
The Overhead Eccentric type, also an unbalanced machine, has the maximum movement at the top of the jaw and consequently has the least leverage where most needed. While the small movement at the bottom of the jaw prevents large rocks from falling thru, the small leverage at the top of the jaw creates destructive shaft bearing pressures when attempting to crush large rocks. Lubrication of such heavily loaded bearings is extremely difficult. This type, therefore, for operational reasons, also has a limited reduction ratio.



Now see how the KUE-KEN overcomes all these defects of ordinary crushers. First, it has two long pendulum type jaws hinged at the top, each swinging to and from each other in *unison and in perfect balance*. Maximum leverage is at the top where it should be, and maximum movement is at the bottom, also where it should be.

Second, the main shaft, with eccentrics and counterbalancing pitmans at 180°, is also in perfect balance. This permits eccentrics to be of extremely long travel, and gives correspondingly low bearing pressures. The simple, balanced toggle system converts this free running motion into powerful crushing strokes, each jaw moving only half the distance needed in an ordinary crusher. Actually, KUE-KEN has five times the leverage (and only one-fifth the pressure on the bearings), of old-style machines.

Third, with KUE-KEN jaws, shaft, pitmans and toggles in perfect balance, low bearing pressures, and oil bath lubrication, the speed is not limited. KUE-KEN crushers run smoothly at the right speed and thus control the size and character of the crushed product. This high speed crushing gives a uniform product in which all particles more nearly approach the setting of the jaws when in the closed position.

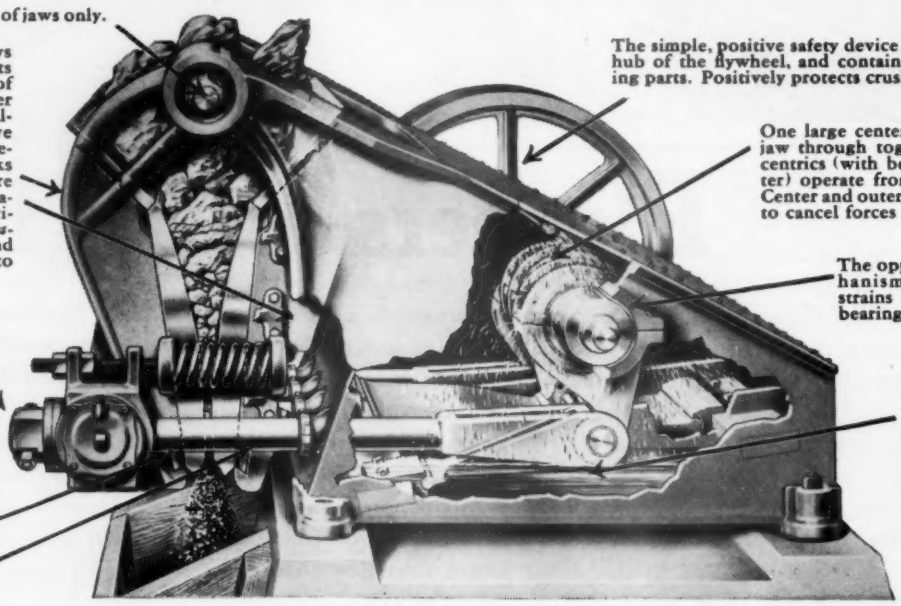


Hinge pins support weight of jaws only.

Two long symmetrical jaws hinged at the top. All points travel downward in an arc of circle as they move together in unison and perfect balance. As there is no relative up or down movement between the jaw plates, rocks are crushed by pure pressure without rubbing or abrasion. This exclusive principle of *crushing without abrasion* uses less power and makes jaw plates last five to ten times longer.

Accessible nuts are positively located on each side rod, locked in one position to prevent unequal adjustment. To change jaw opening, merely remove nuts and add spacers (furnished in various thicknesses), and replace nuts to locked position.

The exclusive KUE-KEN design of rear jaw plate lugs, which permits jaw plates to be worn entirely away without wear on jaw stock itself.



The simple, positive safety device is not visible. It is in the hub of the flywheel, and contains no shearing or breaking parts. Positively protects crusher from tramp iron, etc.

One large center eccentric operates rear jaw through toggles, and two outer eccentrics (with bearing area equal to center) operate front jaw through toggles. Center and outer eccentrics are 180° apart to cancel forces and balance mechanism.

The opposed and balanced mechanism eliminates crushing strains on the shaft and frame bearings.

In *addition* to the splash lubrication, cool oil is pumped from the large dust tight, sealed oil reservoir through an integral filter and then into the shaft bearings and toggles; giving perfect lubrication. A pressure switch automatically stops the crusher if oil supply should fail.

STRAUB MANUFACTURING CO.

451 CHESTNUT STREET
OAKLAND 7, CALIFORNIA

KUE-KEN BALANCED CRUSHERS • RIB CONE BALL MILLS • SCREENWHEEL CLASSIFIERS • OVERHEAD ECCENTRIC CRUSHERS
FEEDERS • AMALGAMATION BARRELS • CONCENTRATING TABLES • SPIRAL CLASSIFIERS • STANDARD OR SECTIONALIZED

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Thousands of Gar Wood Units have been shipped to Concentration Depots and are a part of a tremendous assembly of truck and tractor equipment, supplies, ammunition, tanks, planes, boats and mighty field pieces, poised for instant use on all Fighting Fronts.
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DETROIT 11, MICHIGAN

HOW TO HANDLE A TOUGH ROCK JOB WITH

MAXIMUM SAFETY

WHEN THE JOB calls for quarrying hard rock . . . look to "NITRAMON" A. It has tremendous strength . . . a quick, shattering action similar in effect to 75% gelatin dynamite. It takes hard rock in its stride and its unusual qualities make the job easier . . . with maximum safety.

"NITRAMON" A—like all "NITRAMON" grades—cannot be detonated by the strongest commercial blasting cap, "Primacord," open flame or by the impact of falling objects such as pieces of rock or drill bits. It is supplied in tightly sealed metal containers which offer unlimited water resistance.

"NITRAMON" A has proved its value in well-drill blasting. In addition, its non-headache and easy-loading characteristics make it especially attractive for coyote tunnels.

If you want results with maximum safety, see any Du Pont Explosives Department representative or write: E. I. du Pont de Nemours & Co. (Inc.), Explosives Dept., Wilmington, Delaware.

To take full advantage *of the features that make "Nitramon" the safest blasting agent, it should be detonated only with a combination of "Nitramon" primers and "Primacord."*

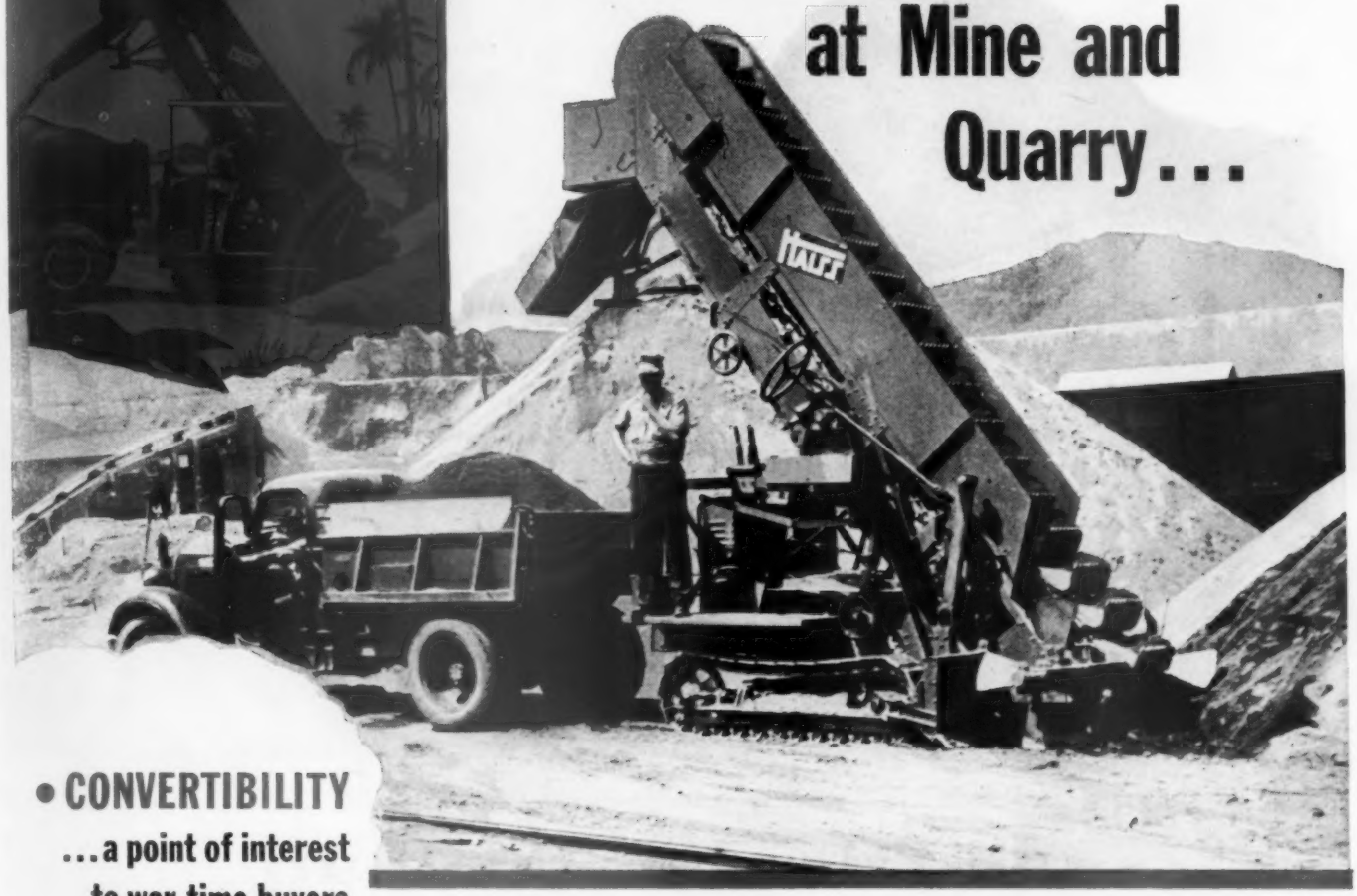
DU PONT "NITRAMON" A

DU PONT

REG. U. S. PAT. OFF.

★ Some in Khaki in Far Places

...Some Carry the Load at Mine and Quarry...



• CONVERTIBILITY

...a point of interest to war-time buyers

The Haiss "75" Loader on creeper mounting is designed for the substitution of wheels and pneumatic tires, when the latter are again freely available.

No reason, then, to postpone buying.

The EXTRA STAMINA inherent in the simple, functional design of HAISS LOADERS is real. Whether loading precious chromite ore or hurrying repairs to a bomb-torn air field, they put up big truck-loads FAST . . . It's the pay off for HAISS superiority in positive self-feeding, efficient slow-speed "crowding" and a Haiss-designed heavy-duty transmission—with all clutches and gears running in oil . . . These same advantages make the HAISS a best buy on every loading job. *Catalog on Request.*

GEORGE HAISS MANUFACTURING CO., INC., 142nd St. & Rider Ave., New York 51, N. Y.

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PORTABLE CONVEYORS ★ LOADERS ★ CLAMSHELL BUCKETS

Old Friend of the Outfit

Pulling a jeep out of a submerged shell hole while under enemy fire takes plenty of you-know-what. True, it's only one of hundreds of jobs an invasion force may be called upon to do. And, it's just one of scores of ways in which good, dependable wire rope comes in mighty handy.

On the far-flung battlefronts—and at home, too—men of action know that even under the most adverse conditions they can count on the performance of Wickwire Rope.

Right now we are making more rope than ever before—but it has more jobs to do in more places. It's smart to take good care of the rope you now have so it will last longer and so our fighting forces can have more for *their* work.

Proper selection, application and usage of wire rope will make it pay dividends in longer life and higher production. Write for a copy of our free book "Know Your Ropes." And, if you have a wire rope question, we'll be happy to be of service. Write Wickwire Spencer Steel Company, 500 Fifth Ave., New York 18, N.Y.

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Thousands of wire rope users—old hands and new—have found "Know Your Ropes" of inestimable value in lengthening life of wire rope. Contains 78 "right and wrong" illustrations, 40 wire rope life savers, 20 diagrams, tables, graphs and charts.

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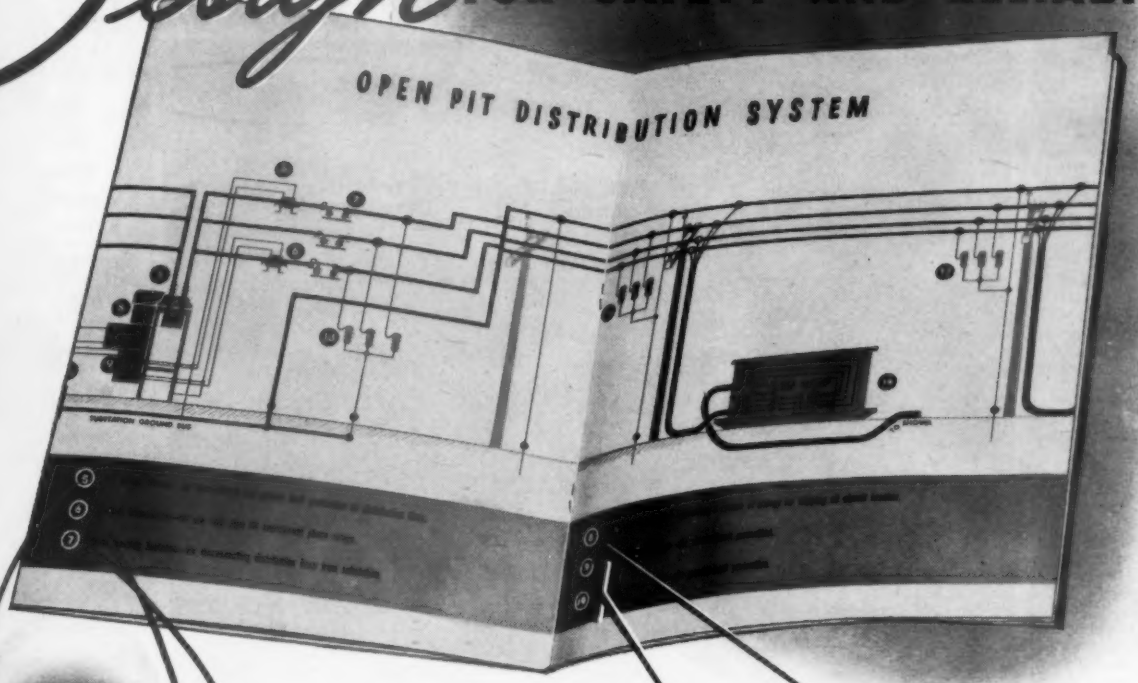
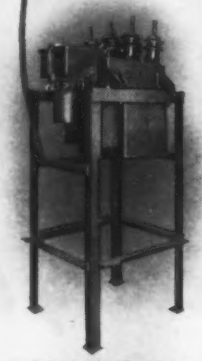
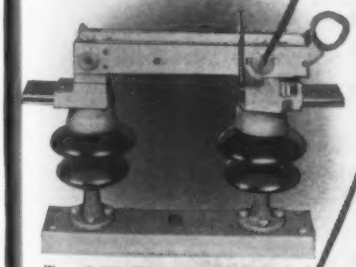
Design FOR SAFETY AND RELIABILITY

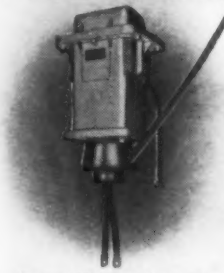




Type FO-22-A Outdoor Oil Circuit Breaker.



Type LCO Disconnecting Switch

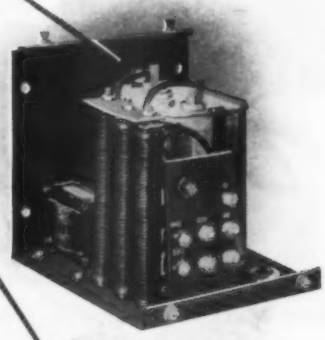


Type WO-15 Current Transformer

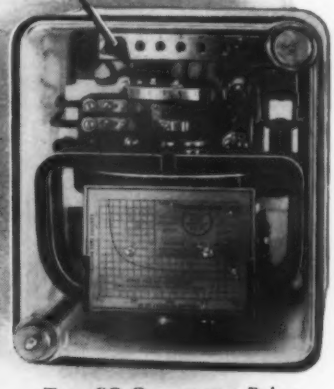
In open-pit mining, there is only one way to assure peak production with complete safety for your employees. Be sure your distribution system has been *designed* to include *every* factor for safety and reliability.

Perhaps your present system is entirely adequate. But it will pay you to check it against accepted standards. Usually, adequate protection can be secured with few changes. Additional equipment may not be necessary—or a few inexpensive protective devices may turn the trick.

To help you in determining whether or not your present system needs a thorough check-up, Westinghouse has prepared a new book on the important subject of open-pit distribution systems. It explains the equipment needed for safety and reliability—and tells why. Complete diagrams, like the one illustrated above, clearly show the advantages you get with the correct equipment. Write today for your copy of B-3282. And if you need the additional help of our engineering staff, just call our nearest office. You'll get their immediate co-operation. Westinghouse Electric & Manufacturing Company, Dept. 7-N, East Pittsburgh, Penna. J-94610



Capacitor Trip Device with cover removed.



Type CO Over-current Relay

Westinghouse

PLANTS IN 25 CITIES ... OFFICES EVERYWHERE

Electrical Equipment for the Mining Industry

NEW YORK HERALD TRIBUNE, SATURDAY, MARCH 11, 1944

akers Work ziFire

Be Black Night, but ever Slips

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U. S. Bakers at Anzio Beachhead Work Under Shellfire

Flour bags afford air-raid protection for American soldiers of the mobile bakery company in Italy.

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"Delivering the Goods" for Victory!

This photo taken "Somewhere in Italy" tells more about Multiwall Paper Bags than could be expressed in thousands of words. (1) The foodstuffs are right up where the fighting men need them; (2) kid gloves were not used to handle the bags; (3) not a single bag has broken, not a pound of flour has been lost, despite abrasion from G.I. trench shoes.

"Foods Fights for Victory" would be a truthful caption for this unretouched* photo of Multiwall Paper Bags containing flour.

*Except for required changing of soldiers' faces.

Multiwall Paper Bags are required for industrial shipments of food products, chemicals, fertilizers, and construction materials — for domestic use and overseas to our armed forces and civilian populations of allied nations and occupied countries.

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"PEAK PERFORMANCE"

Handling approximately 300 tons of material per hour in an Ordnance Plant, this Primary Unit of an Austin-Western Twin-Unit Plant, with its 1036 Jaw Crusher, produced (in the pile at the right) pit fines to be used for secondary roads; and (in the pile at the left) minus 2″ crusher-run rock for base course. At the same time, the Secondary Unit, with its 4022 Roll Crusher, was 100 miles away, producing surfacing material for black-top roads. The two were demonstrating one of several reasons why the Twin-Unit type of Plant is the logical selection for many operators.

Each Unit of the Austin-Western Twin-Unit Plant is capable of producing material that meets the requirements of many jobs—and producing it more efficiently than would be possible with a two-crusher Plant. The complete Twin-Unit Plant, on the other hand, has a capacity and a variety of output far greater than that of any two-crusher Plant. Thus, for maximum output and variety of specification on the one hand, and maximum economy of operation on the other, the owner of a Twin-Unit Plant has the flexibility of operation that spells maximum profits.

AUSTIN-WESTERN COMPANY, AURORA, ILLINOIS, U. S. A.

BUILDERS OF ROAD MACHINERY
Austin-Western
SINCE 1859
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BUY MORE WAR BONDS

Instantaneous Dumping.. High Speed Loading..

Provide Essential War Speed

When war speed is essential Koehring Dumptors have the potential power to provide it. Easy operation . . . plenty of dependable horsepower . . . and instantaneous dumping are a few of the features required in high speed hauling. Instantaneous gravity dump saves time as well as repair costs. Wide body top opening saves time when loading. War construction demands speed and Koehring Dumptors are constant performers where speed is essential.

KOEHRING CO · *Milwaukee 10, Wis.*

. . . DEPEND ON YOUR KOEHRING DISTRIBUTOR to help you keep your equipment operating. Care for your Koehring equipment NOW, so it will serve you tomorrow. Koehring distributors have genuine Koehring parts. Koehring parts warehouses are at your service.

ARMY E NAVY

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HEAVY-DUTY CONSTRUCTION EQUIPMENT

To Make the Most of His Skill He Must Use the Right Tool

Before a carpenter makes a cut with his plane he studies the job—so he'll know *which* plane will produce best results. Is it a deep or thin cut, wide or narrow, with or against the grain? How hard is the wood? Are there knots?

Then he selects the plane that's *built* for that particular job—and *uses* it right. He holds it "just so," applies just the right amount of pressure. Result: A perfect cut.

Explosives, like planes, are also tools. Some explosives produce good breakage on many jobs, but other jobs call for a *special* explosive. And it must be used in the right way. The charge must be planted "just so"— and the right quantity. *Then* you get good blasting, save time, labor, equipment.

Atlas Representatives, with their extensive knowledge of rock formations and explosives, apply synergistic* thinking to the blasting problems of customers—and produce those "2 plus 2 equals 5" results that build blasting profits.

Synergism:** ***The force that produces "2+2=5" results when you and we get together and really "click."

The Atlas man studies all the facts, discusses the pros and cons with the blaster, combines ideas with him. Then the answer evolves: "Use *this* explosive, in *this* amount and in *this* manner—and you will get utmost in fragmentation."

Let us work synergistically with you on YOUR blasting problems. Consult Atlas.

ATLAS EXPLOSIVES

"Everything for Blasting"

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★

Machines like this for applying Rip-Cord closures to cotton valve cement bags enable one operator to sew and bundle over 1000 bags an hour. The conveyor, synchronized with the sewing speed, carries bags through the machine and automatically stacks and counts them.

Bemis Rip-Cord Closure makes cotton cement bags go further

EXPERIENCE of cement manufacturers shows they get greater mileage from cotton bags after adopting the Bemis Rip-Cord Closure. In many cases the number of trips per bag has been increased from 8 to 12...an increase of 50% in the life of the bag.

Rip-Cord-closed bags deliver this extra service to cement manufacturers because neither closing nor opening damages the fabric.

More trips per bag is only one of the economies of using the Rip-Cord Closure. The original cost of bags is less than when made for wire tie closing because bags can be made smaller and without hems. Efficiency in filling is stepped up. There are added savings in handling...in storage and shipping space. Mail the coupon today for complete details on the efficient, economical Bemis Rip-Cord Closure.

BEMIS BAGS

BEMIS BRO. BAG CO.

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Chicago • Denver • Detroit • East Pepperell • Houston • Indianapolis
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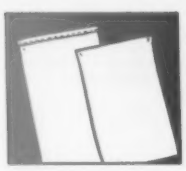
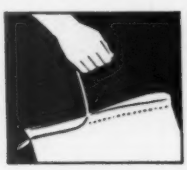
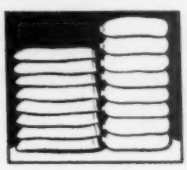
BETTER BAGS FOR 85 YEARS



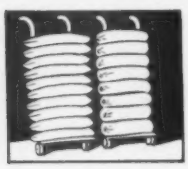
Saves Money! With Rip-Cord Closure bags can be made smaller and without hems and their life is increased, thus reducing costs.



Saves Bags! The Rip-Cord Closure is so easy to open—no tools are required and workmen never need damage bags to remove contents.



Saves Space! Bags closed with Rip-Cord are uniform in size and shape, saving shipping and storage space. Both stacks contain same amount.



Saves Time! More Rip-Cord closed bags can be put on a truck. This means fewer trips for workmen when loading, unloading, storing.

Free Sample
AND LITERATURE

Investigate the economy, added efficiency and sales advantages of the Bemis Rip-Cord Closure. A sample of the Rip-Cord Closure and descriptive folder will be sent promptly upon request.

MAIL THIS COUPON!

BEMIS BRO. BAG CO.
408-P Pine St., St. Louis 2, Mo.

Please send literature describing the Bemis Rip-Cord Closure and a sample.

*Name*_____

*Company*_____

*Street*_____

*City*_____ *State*_____

TELSMITH

CRUSHING AND SCREENING PLANT

U. S. Army Engineers are building a huge dam in Tennessee. It will require 1,500,000 tons of aggregate—4 sizes of crushed rock: 3″- 6″, 1½″- 3″, 3/16″- ¾″, minus 3/16″; and one size of sand.

To produce this material, Ralph E. Mills Co., of Roanoke, Va., opened a quarry at the dam site. The rock is a high calcium limestone. Telsmith designed the complete crushing and screening plant, and furnished most of the equipment. Capacity is in excess of 200 tons per hour.

On war jobs, equipment as well as men must produce more *and faster* without "cracking" under the strain. For years Telsmith has been building equipment that can turn it out, without taking time out. Telsmith complete sand and gravel and rock crushing plants are a *known quantity* to miners, contractors and aggregate producers.

That's why Telsmith gets the call on so many war jobs—to build army and navy air bases, dry docks, roads, dams, and other big construction projects.

That's why your Uncle Sam is now taking most of the Telsmith equipment being built. It's going overseas, to build for the armed forces' needs.

You can get Telsmith equipment—for war work now—and after the war for all your needs. Get Bulletin Q-15 today.

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Q-9

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Same plant as shown above but from opposite end.

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Quarry Plant Equipment

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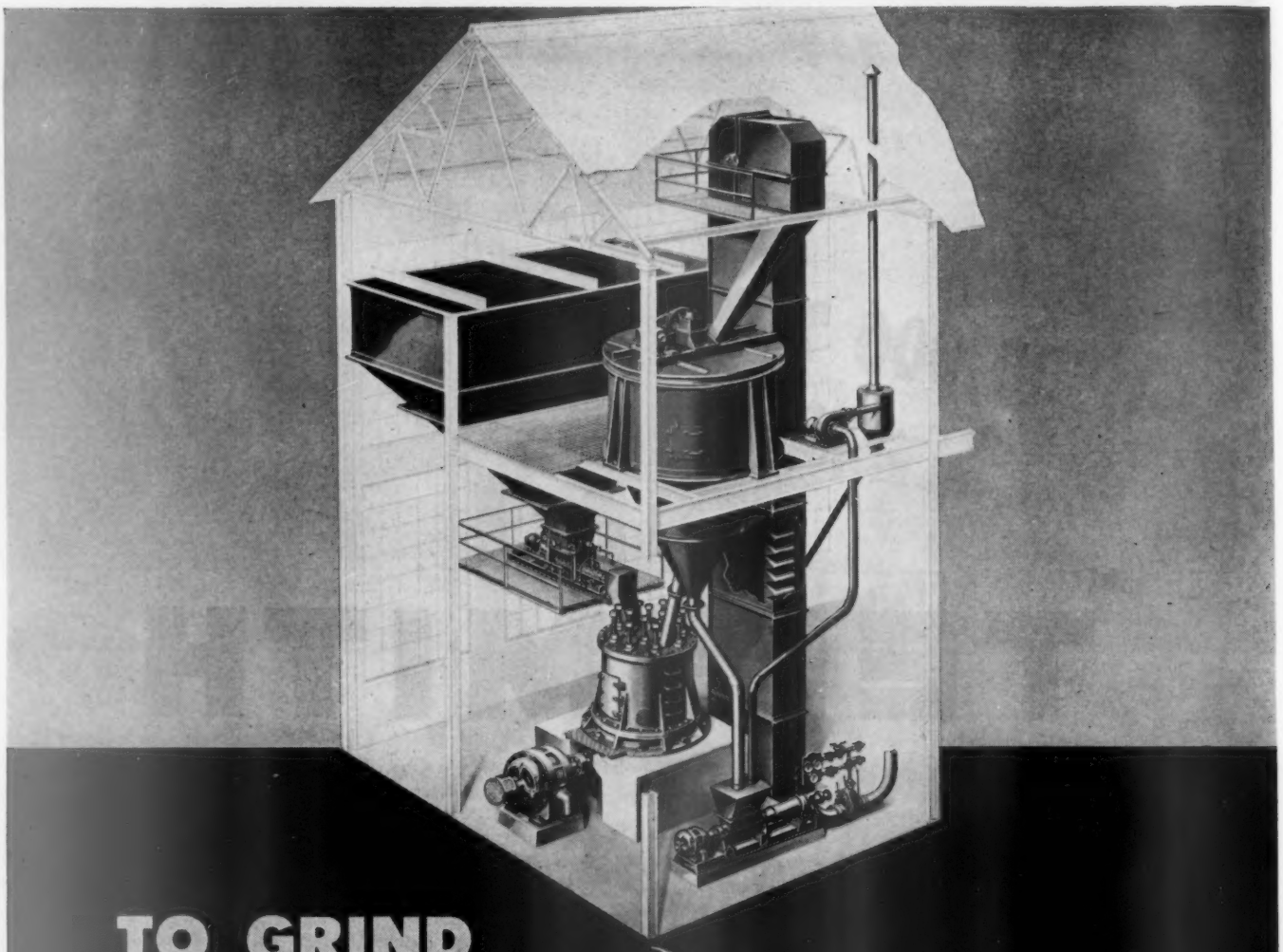

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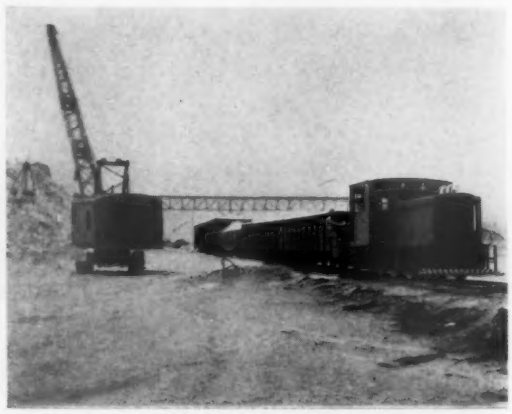
The haulage job at Basic Refractories, Maple Grove, Ohio, ranks with the toughest of them. It's a seven day week job, switching and moving loaded cars that supply limestone for steel mills. When necessary—and that's most of the time—Plymouth can haul a string of 12 to 14 of these cars, each loaded 50,000 to 60,000 pounds per car. Yes, *Plymouth is getting the job done and establishing new performance records while doing it!*

If you want the satisfaction of knowing your industrial haulage problems are being capably met, investigate Plymouth Gasoline and Diesel Locomotives. Talk over your haulage problems with a Plymouth industrial locomotive engineer. *Get a Plymouth and start saving time, fuel and money.* Write for complete information—today!



Plymouth Locomotives are designed and engineered for power, speed, versatility and endurance . . . to satisfactorily complete the toughest industrial haulage assignments day after day, with no days off!

TRACK HAULAGE IS CHEAPER HAULAGE

ALSO BUILDERS OF F-R-H CERAMIC MACHINERY AND SILVER KING TRACTORS

PLYMOUTH GASOLINE and DIESEL LOCOMOTIVES

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Division of The Fate-Root-Heath Co. PLYMOUTH, OHIO, U. S. A.

TYPICAL DIESEL LUBRICATION PROBLEMS:

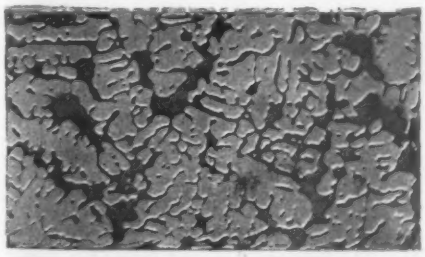
2. Bearing Corrosion

The high speeds of automotive Diesel engines have increased the loads on bearings to such an extent that copper-lead and other alloy bearings are widely used. These bearings, although able to withstand far greater pressures and higher temperatures than the conventional babbitt type, are subject to corrosion.

These same conditions of pressure and temperature promote a reaction between the lubricating oil and the air in the crankcase. When a hydrocarbon lubricating oil is exposed to oxygen at elevated temperatures, the oxygen atoms combine with the oil molecules. With some lubricating oils, this reaction causes them to become corrosive.

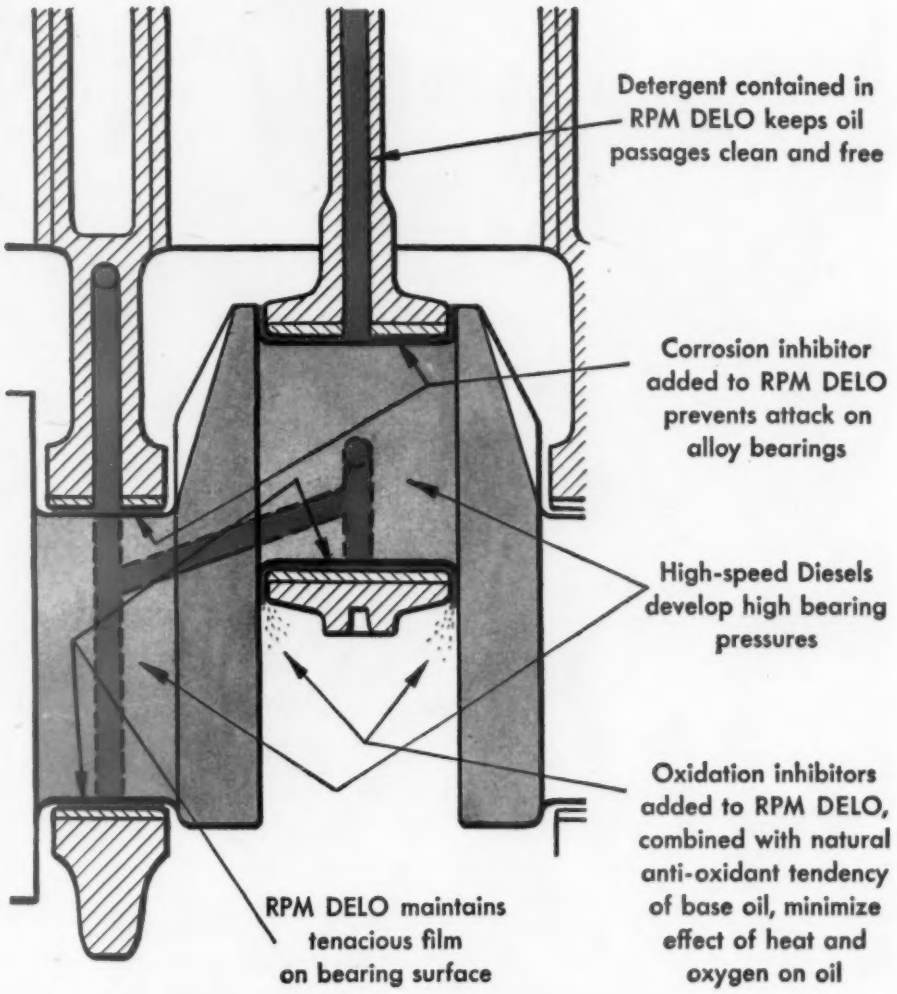
The products formed in this reaction tend to dissolve the lead in the copper-lead structure of the bearing, leaving a porous copper shell which breaks down under pressure.

This tendency, which presents a serious problem to operators of high-speed Diesels, can be entirely overcome through use of RPM DELO in accordance with the recommended procedure.



Top Photo: A photomicrographic cross-section shows the lead component of a new copper-lead bearing in light grey. The copper is shown as red. Note the even distribution throughout.

Bottom Photo: A similar cross-section corroded by use of straight, uncompounded mineral oil. Note how lead has been eaten from surface, leaving copper honeycomb.


Detergent contained in RPM DELO keeps oil passages clean and free
Corrosion inhibitor added to RPM DELO prevents attack on alloy bearings
High-speed Diesels develop high bearing pressures
Oxidation inhibitors added to RPM DELO, combined with natural anti-oxidant tendency of base oil, minimize effect of heat and oxygen on oil
RPM DELO maintains tenacious film on bearing surface

Diagrammatic sketch of connecting rod and crankshaft bearing assembly illustrates one section of engine where RPM DELO reduces overhaul and repair expense.

RPM DELO, in addition to its other properties, prevents bearing corrosion in three separate ways:

1. The base stock of RPM DELO contains natural inhibitors which are highly resistant to oxygen, and minimize the original tendency of all mineral oils to oxidize under heavy-duty conditions.

2. A powerful oxidation inhibitor is added to RPM DELO, which further reduces the rate at which the oil absorbes oxygen.

3. Direct protection is given to the bearing by the corrosion inhibitor added to RPM DELO.

Even more important than its non-corrosive property, is the ability of RPM DELO to eliminate ring-sticking, prevent excessive deposits on rings and ports, and minimize ring and cylinder wear.

RPM DELO has world-wide distribution and is marketed under the following names: RPM DELO, Caltex RPM DELO, Kyso RPM DELO, Signal RPM DELO, Sohio RPM DELO, and Imperial RPM DELO (concentrate). Ask your Diesel engine manufacturer or distributor for the RPM DELO supplier in your vicinity.

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Always "on the go," this 2-cycle Diesel tractor 'dozes sand and gravel into truck loading bunkers and hydraulic washing pits, in addition to handling many other jobs.

The tractor has proved a salvation to material handlers in many ways . . . especially during these times of manpower shortage.

That new road you need for bringing in supplies and hauling out aggregate is cut through quickly with powerful, fast-working 2-cycle Diesels. Stripping or cleaning-up work is now handled at the fastest pace in history . . . and at correspondingly lower costs. Especially ideal is the ease with which you clear trees, stumps and debris . . . or move your machinery from place to place.

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REMOVING Impurities

With the . . .

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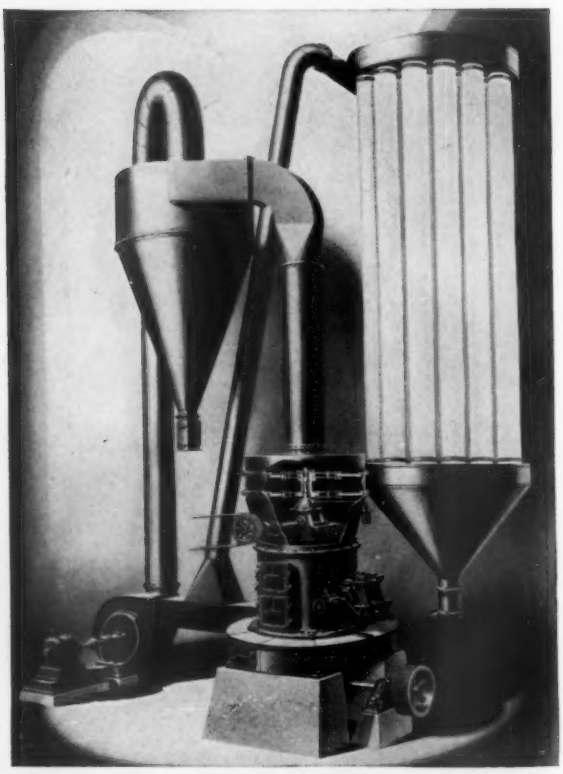
Take advantage of Raymond Roller Mill economy for grinding limestone, dolomite, bauxite, phosphate rock, bentonite, clays and many other non-metallic minerals and manufactured products.



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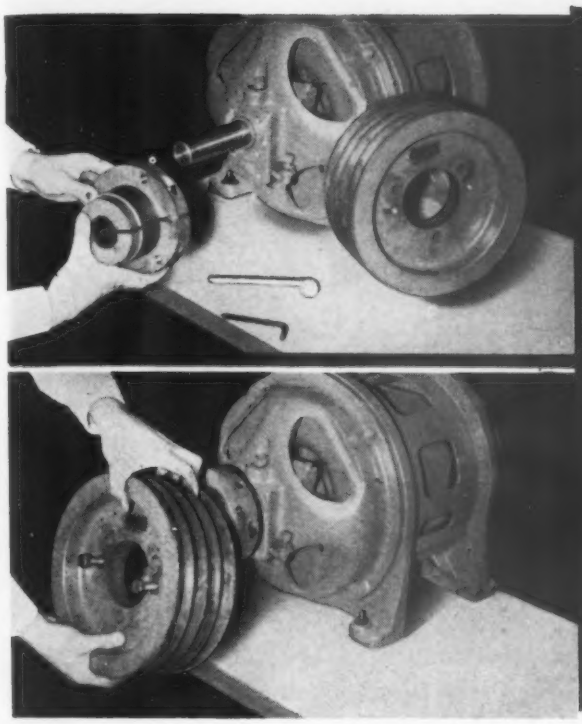
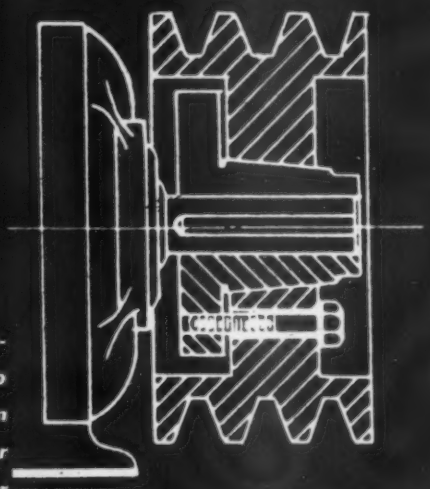
NO OTHER SHEAVE HAS THESE 3 ADVANTAGES





Split hub makes installation easy. Hub stays put—only rim is changed. Bigger pull-up bolts—higher taper cone pressure.

Worthington's QD Sheave is easy to get on, easy to get off, yet always tight on the shaft

If you have ever been in the shop when old-fashioned sheaves were being changed . . . saw workmen sledging and prying and sweating to get one off and another on . . . got an earful of loose fits, tight fits, misalignment, then you'll appreciate these advantages of Worthington's QD sheaves.

With the QD, the hub stays put, because a variety of sizes of rims fit it. When changes are made for different speeds, the rim is easily removed and replaced. On all other sheaves, the hub has to be loosened, presenting a realignment problem when the hub is drawn up to the rim. Once you put on the hub of the QD sheave, alignment problems are permanently solved.

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YOU WOULDN'T TAPE THE FINGERS OF A *pianist*

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Of course, this analogy is far-fetched but it is still true that the wires and strands of non-preformed wire rope are virtually locked in position—under constant stress—uncomfortable—cranky. Being so, non-preformed cannot work so well, nor long, as Hazard LAY-SET, which is preformed at the mill and entirely relieved of internal torsional stresses and strains. LAY-SET Preformed wire rope gives you greater dollar value, requires no seizing when cut; it resists kinking and whipping; it is easier to splice and safer to handle. And, invariably, it wears longer.

Ever since Pearl Harbor, and even before, Hazard LAY-SET Preformed has been saving time and money for the Government, the Armed Forces, and the taxpayer.

Specify Hazard LAY-SET Preformed for *all* its built-in advantages.

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HAZARD LAY·SET *Preformed* WIRE ROPE

Power...

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Chain pump used in mining districts during the 16th Century.

Bettmann Archives

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Service is
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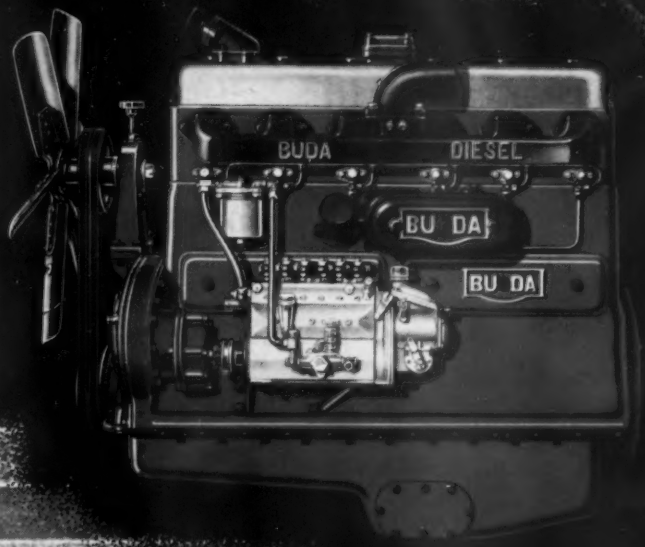

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KNOW

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- How to save Power
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- How to decrease Manganese Wear

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- Why a Gearless Crusher has greater Capacity
- Why proper Concave Design produces uniform Product
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- Why Repairs are less with a Gearless Crusher
- Why Kennedy Van Saun makes Gearless Crushers

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8—Less fatigue to operator
9—More production
10—Lower ultimate cost

—a MANHATTAN Development

brings you 10 advantages important in war or peace

IN WAR—The homogeneous and extremely flexible construction achieved by MANHATTAN Strength Members of super-strength cords and the balanced, engineered method by which they are applied and inseparably combined with the FLEXLASTICS* tube and cover, together give a service impossible a few short years ago.

Every one of these advantages contributes to greater production through less fatigue to operator and to much longer hose life—therefore fewer interruptions.

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IN PEACE—All these advantages will have cumulative value for you in the forthcoming competitive period. Then the multiple economies of long service life; resistance to high working pressures and surges; easy handling with less operator fatigue because of its light weight; toughness to withstand wear, abrasion and kinking; will help keep costs down and profits up.

Manhattan's Condor Brand Homo-Flex Hose is or will be available in types for the following services: Air, Water, Steam Pressing Iron, Orchard Spray, High Pressure Mine Spray, High Pressure Oil Spray.

Buy more BONDS to bring the boys down the home stretch

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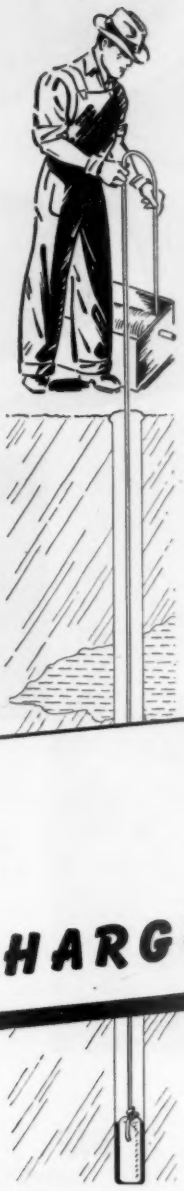


Get More Kick
OUT OF THE BOTTOM CHARGE

To make sure that the powder at the bottom of the hole "goes" with its maximum force, give it the extra kick imparted by Primacord. This can be done only by lacing the Primacord through the first cartridge and lowering this to the bottom of the hole. The remaining cartridges are then loaded in the usual manner, and the Primacord, extending up the side of the hole, acts as the detonating agent *for each cartridge in the load.* Result — a powerful shot *all the way down* . . . with economy in powder used, easier loading, greater safety, *and better blasting.*

Send for the Primacord book — it's full of *profitable* blasting suggestions.

13

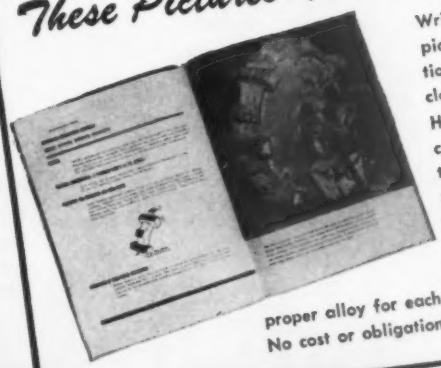
PRIMACORD-BICKFORD
Detonating Fuse
Manufacturers of Safety Fuse since 1836

THE ENSIGN-BICKFORD COMPANY • SIMSBURY, CONNECTICUT

STOODY SELF-HARDENING HALTS SPOT WEAR!

Buckets and dipper fronts invariably wear unevenly, areas receiving greatest abrasion naturally being first to give way. Many shovel users make it a practice to patch worn spots by welding in sections of manganese or high carbon steel plate thus restoring original wall thickness. This procedure is effective, but strictly temporary because manganese plate offers no greater wear resistance than the surrounding metal and will wear away just as rapidly as the original base steel.

These Pictures Tell the Story!



Write for Stoody's pictorial "Specification Sheets." Shows closeups of Stoody Hard-Facing applications on many types of heavy equipment. Tells in few words recommended hard-facing procedures and proper alloy for each type of application. No cost or obligation. Write today!

STOODY SELF-HARDENING PROVIDES THE EXTRA WEAR RESISTANCE NEEDED FOR FAST WEARING SPOTS. Not only is it much harder and more wear resistant than ordinary steel, but it is also tough and will stand severe impact. The way to get maximum shovel efficiency and avoid frequent delay for routine repairs is to hard-face areas where wear is concentrated. Thereafter the abrasion normally causing greatest damage is received by the hard metal and wear is evenly distributed over the entire bucket surface.

Stoody Self-Hardening is very easy to apply and forms a strong bond with manganese steel. It is available both in coated and bare rods for D. C. Electric application and can be purchased through Stoody distributors located in all major cities. 3/16" and 1/4" diameter rods are priced at only $.50 per lb., F. O. B. Whittier, Calif., or distributors' warehouses.

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1126 WEST SLAUSON AVENUE, WHITTIER, CALIFORNIA

STOODY HARD-FACING ALLOYS
Retard wear . . . Save Repair

PIT AND QUARRY

Vol. 36 JUNE, 1944 No. 12

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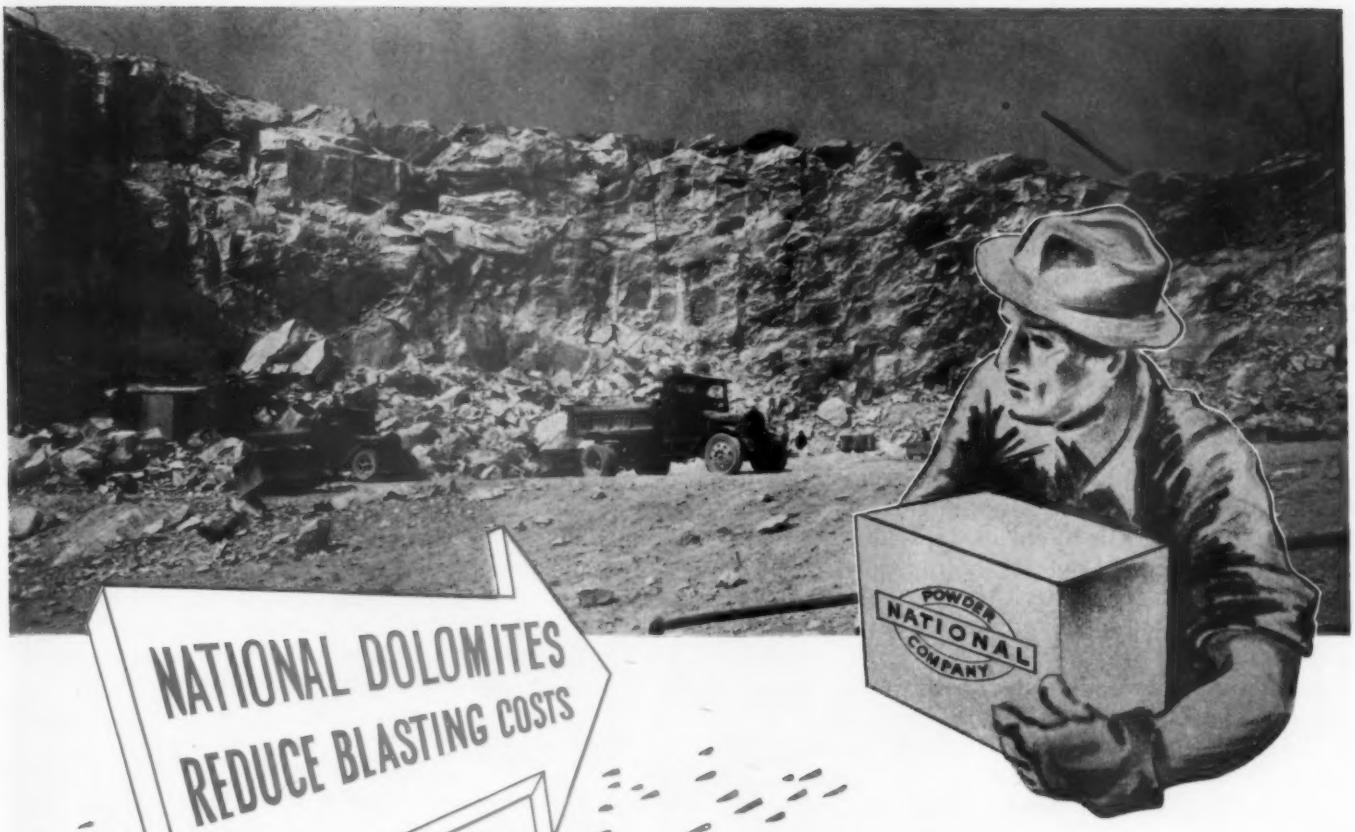


de Dolomieu analyzed and found uses for the formation of rock which he named for himself—Dolomite. National Powder Company in formulating the Dolomite series of quarry powders named this series of high explosives for that famous French geologist D. de Dolomieu.

The table shows the savings that quarrymen can effect by substituting National Dolomites for Ammonia Dynamites.

SAVINGS FROM REPLACEMENT OF STANDARD OR AMMONIA DYNAMITES BY DOLOMITES

Brand and %	Ctgs. per 100 lbs. 1¼x8	C/L Price per 100 lbs.	Replaced on a Ctg. for Ctg. basis by	Ctg. Count of Replacement	Cost for Equivalent No. Ctgs. of Dolomite to Replace 100 lbs.	Savings for Each 100 lbs. Replaced	Savings per 20,000 lbs. C/L of Am. Dyn. Replaced
60% Am. Dyn.	220	$11.00	Dolomite 2	240	$10.10	$0.90	$180.00
50% Am. Dyn.	216	10.50	Dolomite 3	260	9.15	1.35	270.00
50% Am. Dyn.	216	10.50	Dolomite 2	240	9.90	0.60	120.00
40% Am. Dyn.	216	10.50	Dolomite 4	280	8.50	1.50	300.00
40% Am. Dyn.	216	10.00	Dolomite 3	260	9.15	0.85	170.00
30% Am. Dyn.	216	9.85	Dolomite 5	306	7.75	2.10	420.00
30% Am. Dyn.	216	9.85	Dolomite 4	280	8.50	1.35	270.00
20% Am. Dyn.	216	9.70	Dolomite 6	330	7.20	2.50	500.00
20% Am. Dyn.	216	9.70	Dolomite 5	306	7.75	1.95	390.00

MANUFACTURERS OF HIGH EXPLOSIVES FOR ALL INDUSTRIAL PURPOSES

NATIONAL POWDER COMPANY

"NOT LIVING ON OUR REPUTATION BUT BUILDING IT."

ELDRED, McKEAN COUNTY, PENNSYLVANIA

EDITORIAL

Employers, Too, May Speak Freely

THE safeguards of liberty set up by our Constitution have frequently been threatened in recent years by the provisions of laws passed in presumable conformity with it as well as by regulations and directives issued by the many government bureaus established under congressional authority. Freedom of speech is one of the most highly prized guaranties of individual liberty of the many provided by the Constitution and when it stands in danger one may well wonder whether the others, which depend largely on it, can be preserved. It is refreshing and encouraging, therefore, to observe a recent example of the tenacity with which our courts defend the right of free speech among a people that prides itself on its many liberties and is now engaged in the greatest struggle of all time to maintain them.

Despite the guaranties provided by the Constitution, freedom of speech, which is a right common to us all, has been denied to portions of our people at various times and in varying degrees. Large sections of the population understand freedom of speech as a theoretical right but their opportunities to practice it are subjected to restrictions and prohibitions of different kinds. During the last eight or nine years a new class of Americans has felt the pressure of restrictions on the exercise of that right. Under the provisions of the Wagner act as interpreted by the National Labor Relations Board employers have been subjected to a theory of freedom of speech which was applied differently in different cases and they found themselves dealt with in a manner that was not intended by the framers of the law or by those who enacted it. While it is true that the law seeks to prevent an improper exercise of the employer's right of free speech, it affords opportunity for the application of dangerous restraints, and this opportunity has too often been misused in decisions of that board.

Now, fortunately, comes the Third Circuit Court of Appeals in Philadelphia with a unanimous decision declaring that the Congress did not intend, when it enacted the National Labor Relations Act, to infringe the employer's right of free speech but only to prevent unfair treatment of employees by the use of speech that has the effect of threatening or coercing them or discriminating against them. In the case mentioned the National Labor Relations Board sought to have an employer company and its president held in contempt of court for having written a letter to its workers after the board had ordered the dissolution of a union alleged to have been of the "company" variety. In rejecting the petition of the board, Judge Charles Alvin Jones, who wrote the decision, said in part that the law "does not purport to authorize a restraint upon freedom of speech in any circumstances. . . . Had there been such a provision in the statute [the National Labor Relations Act], it would have been invalid as in contravention of the First Amendment. . . . Accordingly, it is our opinion that it was not the intention of Congress to forbid an employer from expressing opinions as to labor unions or to anything else so long as his expressions do not constitute, or contribute to, acts or threats of discrimination, coercion or intimidation in denial of his employees' free and untrammeled exercise of their rights as guaranteed by the act."

To those who have become increasingly fearful of the growing disregard of the rights of employers as disclosed by National Labor Relations Board decrees this decision will come as a great relief and encouragement. There have been numerous cases where the utmost freedom in speaking with regard to employers involved in labor disputes has been demanded by, conceded to and exercised by workers and their union representatives, who, at the same time, have insisted upon an unjustiably narrow interpretation of the Wagner act's provisions respecting coercion. Almost anything an employer might say, even though factual and informative and without prejudice, has been construed as having been spoken or written in violation of the law's provisions and as constituting acts or threats of coercion or intimidation within their meaning.

IT is obviously unfair that workers and their representatives should have been allowed to make the strongest statements about employers and their policies while employers have been denied the right to reply to such charges. Even when this denial of the right of free speech has not been formal, the fear of prosecution has deterred many an employer from making even the simplest kind of statement explaining or justifying the position he had taken. The extent to which this policy was carried by the National Labor Relations Board is sufficiently indicated by a statement made by its chairman, J. Warren Madden, who some years ago told a Senate investigating committee that an employer who called a labor-union officer a Communist might be considered guilty of coercion under the law which created it even though the statement were true. The fact that the House of Representatives, in its recent consideration of proposed amendments to the Wagner act, included one that was designed to protect the right of employers to make statements on labor subjects when "not acompanied by acts of coercion, intimidation, discrimination, or threats thereof" shows clearly that legislators do not intend, and that those of them who voted for the enactment of the law did not intend, to restrain employers in the exercise of their constitutional rights.

Now that the situation has been clarified by judicial decision, employers engaged in labor disputes may feel confident that their right to express themselves freely, if truthfully, on all matters pertaining to their relations with their employees and the latter's representatives will be upheld in our courts of law and that the right of free speech is not subject to interpretations based on the sympathies or prejudices of labor board members.

AIR POWER "Softens 'em up"

Portable gasoline driven SCHRAMM Air Compressor operating heavy duty wagon drill in limestone rock quarry.

when the
SCHRAMM
PORTABLE AIR
COMPRESSOR
is on the job

Rock quarrying is always a tough job—like a "beach-head landing"—unless the "Air Force" has thoroughly prepared the ground!

That's why quarry operators rely upon SCHRAMM Portable Compressors to supply the necessary power in quarrying hard-to-break stone.

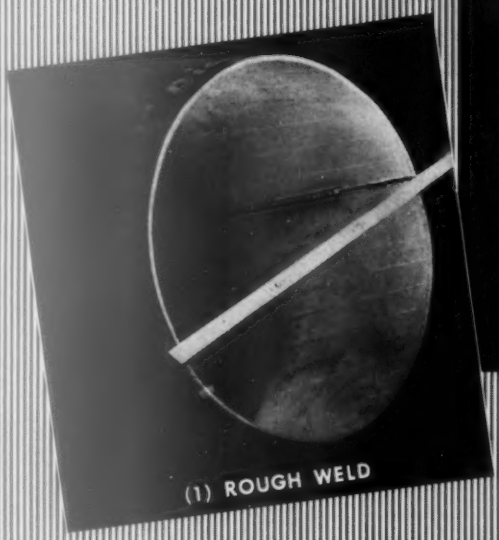
The Model 210 SCHRAMM unit pictured above is rubber tire mounted, providing fast and easy portability and maneuverability on difficult jobs. SCHRAMM machines are compact, rugged and light-weight—the result of over 40 years' development—and guarantee minimum transportation and operating costs.

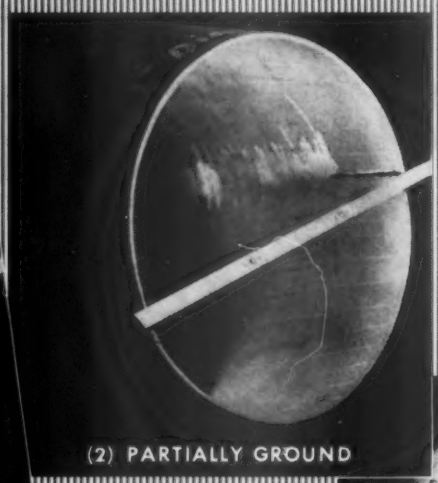
SCHRAMM Compressors are available in a wide range of models and sizes. Complete catalogs furnished on request.

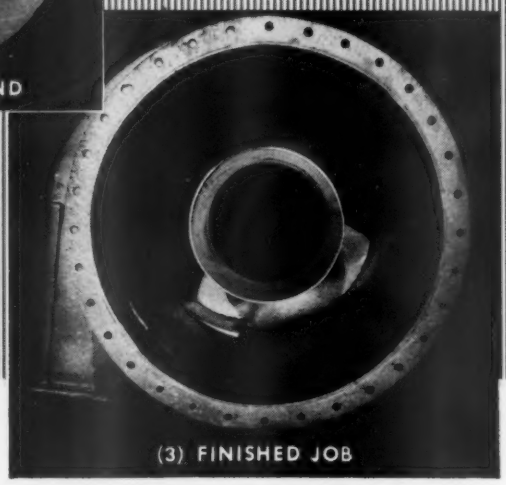
"We Build 'em Better"

SCHRAMM
INCORPORATED
THE COMPRESSOR PEOPLE
WEST CHESTER, PENNA.

Next to Split-Duct Manifolds . . . INNER WELDS GROUND SMOOTH







No. 6 Reason for

Buell's High Efficiency, Low Maintenance, Long Life

• THE PROPER FINISHING of the inner surface of all welds in Buell (van Tongeren) Cyclones has a direct bearing upon first, their operating efficiency, second, their length of life.

Any projection in a gas stream will affect the efficiency of a dust collector. Surface irregularities create undue turbulence and cause the reentrainment in the gas stream of previously separated dust particles. Moreover, if the weld-bead is not ground smooth, rapid erosion of the surface beyond the bead will take place, due to the formation of a local eddy current at this point. And continued erosion will shorten the life of the stoutest dust collector.

Smoothly ground inner welds are one more reason for Buell's high efficiency, long life, trouble-free operation, and low maintenance cost. Reasons supported by the wide use of Buell Dust Recovery Systems throughout industry.

Write for a copy of the illustrated book—"The van Tongeren System of Industrial Dust Recovery," containing facts about this patented system, interesting alike to engineer and executive.

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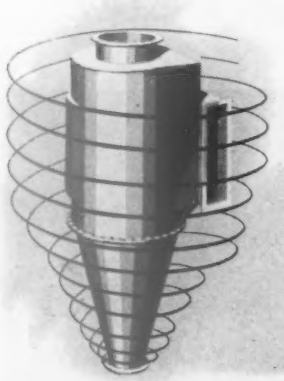


buell
DUST RECOVERY SYSTEMS

BUELL FEATURES	RESULT IN	PRODUCE
SHAVE-OFF LARGE DIAMETERS	HIGH COLLECTION EFFICIENCY	GREATER RECOVERY
EXTRA-THICK METAL	LESS FAN BLADE WEAR	LOW MAINTENANCE
LARGE OUTLETS	LOW DRAFT LOSS	LOW OPERATING COST
INNER WELDS GROUND SMOOTH	LOW POWER CONSUMPTION	LONG LIFE
CORRECTLY DESIGNED HOPPERS	HIGH TEMPERATURE RESISTANCE	NO CLOGGING
SPLIT-DUCT MANIFOLDS	UNLIMITED CAPACITY	
	NO MOVING PARTS	
	FREE DUST FLOW	

DESIGNED TO DO A JOB, NOT JUST TO MEET A "SPEC"

Penn-Dixie Elevates Newhard to Post of Supervising Chemist

E. P. Newhard, who since 1931 has been superintendent of the Pennsylvania-Dixie Cement Corporation plant at Clinchfield, Georgia, has been advanced to the position of supervising chemist. In his new position, Mr. Newhard will exercise control over the processes employed

E. P. Newhard

S. G. McAnally

in all Penn-Dixie plants insofar as they affect the quality of the product. He will also direct the research work of the corporation's laboratories. This change has required the removal of Mr. Newhard to the general offices at Nazareth, Pennyslvania.

S. G. McAnally has been appointed to succeed Mr. Newhard as superintendent of the Clinchfield plant. Mr. McAnally is a graduate of the University of Glasgow, Scotland, and has had many years of experience in the operation of cement plants in this country and in Brazil.

Waianae Anniversaries Marked by Festivity

Hawaiian Gas Products, Ltd., held a *luau** recently for its Waianae plant employees and company officials in celebration of four events: the company's 35th anniversary; the 50th birthday of Allen Renton, president and general manager; the 25th anniversary of Mr. Renton's service with the company; and the production of the first commercial cement manufactured on Oahu. By completing the first batch of cement in time to present it to Mr. Renton at the *luau,* Louis N. Bryant, manager of the company's new cement department, kept a promise made several months before to produce cement at Waianae before the end of March.

The firm was started in 1909 as the Acetelene Light & Agency Company, Ltd., and in 1920 it was reorganized under its present name. In addition to its Waianae plant, the company operates plants in Kalihi and in Iwilei.

*In case you are wondering, Webster divulges that a *luau* is a feast.—Ed.

Coming Events

June 8-9, 1944 — Hot Springs, Virginia. Annual meeting, National Industrial Sand Association, The Homestead.

June 19-22, 1944 — Pittsburgh. Semi-annual meeting, American Society of Mechanical Engineers.

June 26-30, 1944 — New York. Annual meeting, American Society for Testing Materials, Waldorf-Astoria Hotel.

August 15, 1944 — Chicago. Semi-annual board meeting, National Ready Mixed Concrete Association, Palmer House.

August 16, 1944 — Chicago. Semi-annual board meeting, National Sand and Gravel Association, Palmer House.

Kaiser Is Reported Ready to Purchase Yosemite Portland

Henry J. Kaiser, Pacific Coast shipbuilder and head of the Permanente Cement Corporation, is reported to have made an offer to buy the plant of the Yosemite Portland Cement Company at Merced, California.

The proposed purchase will be voted upon at a special meeting of Yosemite stockholders to be held in the near future. If sold, the 257,367 shares of $10 preferred stock would receive par value for their shares, leaving little or nothing for the class A and Class B common stockholders. The preferred stock which had been quoted at around $2 on the San Francisco exchange, quickly rose above $6 when rumors of the proposed liquidation became known.

The main factor in the decision of the management to abandon operation of the plant was the likelihood that the Yosemite Valley Railroad will cease operating shortly. The railroad has been the only means of transporting rock to the cement plant from its quarry many miles distant.

Just what use Mr. Kaiser plans to make of the plant and its equipment if the purchase is completed has not been revealed.

Buys Erin Lime Plant; Quarry Leased to TVA

The Metcalf Stone Company, headed by Thomas H. Metcalf, has taken over the Erin Lime & Stone Company, Erin, Tennessee. The burning of lime has been discontinued due to the labor shortage.

The crushed-stone quarry has been leased to the Memphis Stone & Gravel Company and a new quarry has been leased to the T.V.A. Mr. Metcalf is now serving in the United States armed forces.

O. L. Moore Retires at Universal Atlas; Lindsay Gets Post

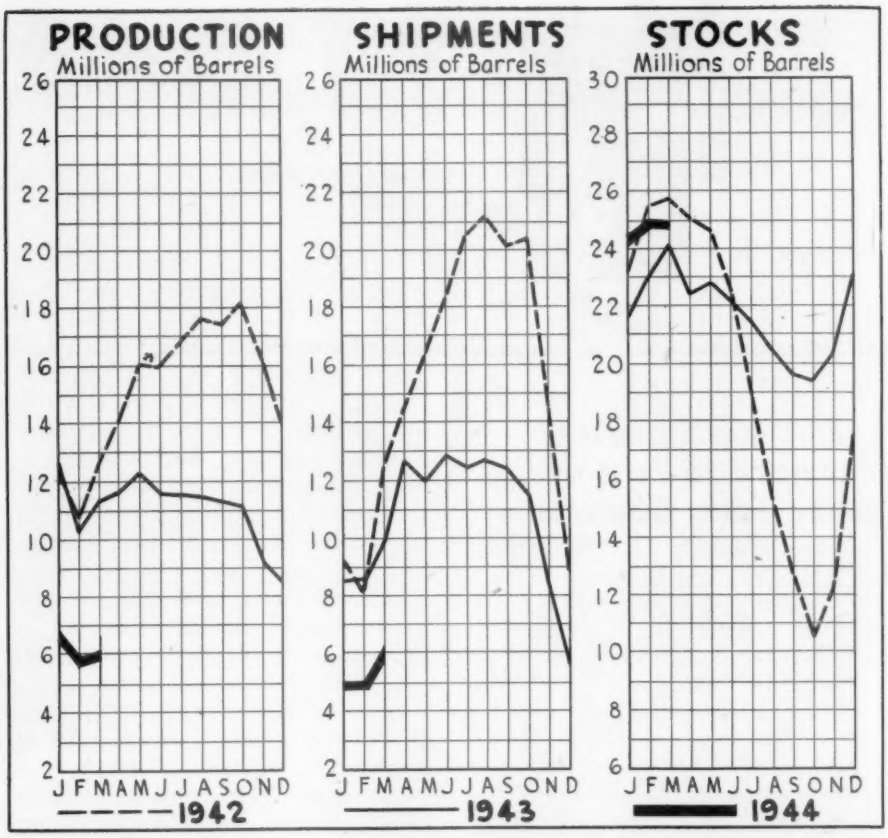
George L. Lindsay, assistant director, has been appointed director of tests and research, Universal Atlas Cement Company, succeeding O. L. Moore, who is retiring after 30 years of service with the company. Mr. Moore long has sought more leisure and was dissuaded from retiring several years ago.

After graduating in civil engineering from Carnegie Institute of Technology in 1914, Mr. Moore joined the company as foreman in the physical laboratory at its Universal, Pennsylvania, plant. In 1916 he became inspector at the Duluth plant and in 1917 went to Chicago as engineer, Inspection Bureau. In 1926 he was promoted to engineer of tests, and in 1937 was appointed director of tests and research.

Mr. Moore is a member of the American Concrete Institute and of the American Society for Testing Materials. He served two years on the Executive Committee of the latter society and for many years as a member of its Committee C-1 on cement where he was particularly active in the development of the compression method of testing cement. Under his direction the company improved its technique of testing at each of its nine plants, made extensive studies of the characteristics and properties of cement and concrete, and developed a special cement with a retarded set for cementing deep, hot oil wells. It was under his direction that air-entraining Portland cement was developed for use in fortifying concrete pavements against freezing and thawing weather and making them highly resistant to the scaling action of de-icing salts. He also directed research leading to a standard method of test for determining the amount of entrained air which is the key to the proper performance of air-entraining Portland cement.

O. L. Moore

G. L. Lindsay

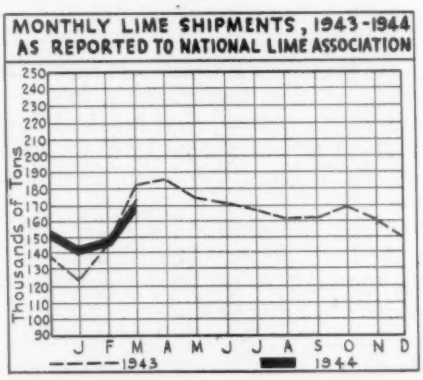


Output of 6,139,000 barrels of finished Portland cement during March, 1944, reported to the Bureau of Mines, was 64 per cent. below production in the corresponding month of 1943; a relatively unchanged rate of decline from the 45 per cent. decrease recorded in February. The monthly rate of decline has fluctuated between 41 and 50 per cent. since October, 1943. Shipments from mills during March showed less than the usual seasonal advance over February and totaled 6,225,000 barrels which was 38 per cent. below the mill movement in March, 1943.

George L. Lindsay, Mr. Moore's successor, long has been associated with him. He worked at the company's Duluth plant on construction, in the physical laboratory, and as a cement tester during several vacation periods before and after entering the University of Minnesota to study chemical engineering. Upon graduation in 1921 he rejoined the company as a chemist at Duluth, and in 1925 moved to the main office in Chicago where he successively served as engineer, Inspection Bureau, and engineer of tests. In recent years he held the position of assistant director of tests and research. Mr. Lindsay has traveled extensively in connection with the company's research and testing work at its various plants and in connection with tests and research in construction work and in the oil fields. He is a member of the American Society for Testing Materials and of the American Concrete Institute and its Committee 714.

500-Ton Asphalt Plant to be Built in Ohio

An asphalt plant with a capacity of 500 tons daily will be constructed near Dresden, Ohio, by Shelley and Sands, Inc., of Thornville. John Zeller, formerly of the Muskingum County Engineering Department, has been named manager and superintendent of the plant.



According to data collected by the National Lime Association, 59 companies in March, 1944, shipped 172,924 tons of lime (109,132 quicklime; 63,792 hydrate). Reporting companies represent 43.0 per cent. of the association's total capacity of record. Based on PIT AND QUARRY'S estimates for the remainder of the industry, the total shipments for the month by all plants were approximately 425,000 tons. Shipments of lime by users for March, 1944, were:

Use	Quicklime (tons)	Hydrate (tons)
Agricultural	5,054	25,856
Building	7,595	15,415
Chemical	96,483	22,521
Total	109,132	63,792

Glacier S. & G. Sold to Permanente; Will Add Storage Silos

The Glacier Sand & Gravel Company of Seattle has been purchased by Henry J. Kaiser's Permanente Cement Corporation and A. A. Dresser has been placed in charge of the properties.

"Purchase of the stock of the Glacier Sand & Gravel Company is the initial step in providing distribution for Permanente cement in the Seattle area," Mr. Dresser disclosed. "Silos for handling bulk cement to be shipped in by boat will be constructed as soon as the materials and manpower can be made available."

J. A. McEachern has been named president of the Seattle company. Other officials are: E. E. Trefethen, Jr., vice-president; L. S. Corey, treasurer, and G. G. Sherwood, secretary.

Besides Messrs. Kaiser and McEachern, the board of directors will include: Edward H. Heller, Gili J. Shea, Harry W. Morrison, and Messrs. Corey and Trefethen.

F. L. Jaeger, Marquette Sales Head, Retires

The Marquette Cement Manufacturing Company announces the retirement of F. L. Jaeger from active service as of April 1.

F. L. Jaeger

Mr. Jaeger spent 25 of his 33 years in the cement industry, and had been with Marquette since he started with the company as a salesman in Iowa in 1919. He was southern sales manager at Memphis for 10 years and then promoted to the post of general sales manager with headquarters at Marquette's general offices in Chicago. Later he was made a vice-president of the company.

Barnhart Acquires Two South Dakota Plants

Spencer Quarries, Inc., a newly chartered corporation, has acquired the holdings of the Consolidated Sand & Stone Company of Sioux Falls and Spencer, South Dakota. Walter A. Barnhart, of the W. A. Barnhart Construction Company, is president and general manager of the new company. Mr. Barnhart has been active in the aggregate and concrete-products manufacturing business in the state for over 30 years. General offices will be maintained at Spencer.

The holdings of the new company consist of the quartzite quarry and crushing plant at Spencer and a sand-and-gravel processing plant at Sioux Falls.

Virginia Lime Workers Vote for AFL Union

The National Labor Relations Board has announced the certification that the United Cement, Lime and Gypsum Workers International Union, A.F.L., has been selected by a majority of all employees of the Standard Lime & Stone Company, near Strasburg, Virginia. The union is the exclusive representative of all production and maintenance employees, with certain exclusions, for the purpose of collective bargaining.

Retired Cincinnati Operator Is Dead

William Bushelman, 60, who had been in the sand-and-gravel business in Cincinnati for many years, died April 9 at his home in that city. He had suffered a stroke of paralysis a week before his death.

He was one of the founders of the North Cincinnati Sand & Gravel Company in 1930. He leaves his widow, Mrs. Cecilia E. Bushelman; a daughter, Mrs. Irene Beck, two sons, Herbert and William; and four grandchildren.

W. J. Stewart Passes Away in Missouri

William J. Stewart, a retired vice-president of the Marblehead Lime Company, died at Columbia, Missouri, recently. He was 75 years old.

Mr. Stewart was born in St. Louis. He entered the lime business at the age of 16 years when he took a job with the Old Anchor Line of lake ships in Chicago. He was auditor of the Northwestern Steamship Company and in 1902 joined the staff of the Marblehead Lime Company. He was sent to Kansas City in 1905 as western manager and became vice-president in 1909.

In 1941 Mr. Stewart retired and moved to Columbia.

Check-Off Dispute at Barberton Plant to Be Renegotiated

The National War Labor Board has directed the Pittsburgh Plate Glass Company and the United Mine Workers of America, District 50, to negotiate further on the issue of a check-off of union dues at the company's Barberton, Ohio, plant.

The board set aside a provision contained in a directive order issued by the Fifth Regional War Labor Board in Cleveland, calling for a check-off of union dues based on voluntary written authorization of the individual members.

Approximately 1,600 workers employed at the plant and mine are involved in the case.

The company appealed to the national board for review of the check-off provision in the order.

In the past the company has followed the practice of laying-off men who persist in failing to pay dues. This arrangement was voluntarily instituted by the company and is not contained in a written agreement. There is no provision in the contract for any degree of union security, but the company and the union have worked amicably together in the past. The union did not ask for, and the regional board did not order, a maintenance-of-membership clause in the contract.

In sending the issue of the check-off back to the parties for further negotiation, the WLB retained jurisdiction over the dispute pending receipt of a report from the company and union as to the progress of negotiations.

The board sustained the regional board's order in all other respects. Industry members dissented from the majority's declining to review a 6c-an-hour premium awarded by the regional board to underground workers.

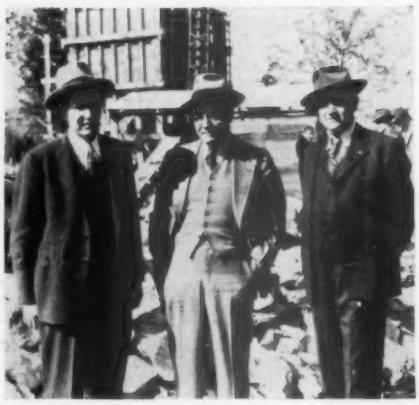
Lambert Firm's Plants on Southern War Jobs

Lambert Brothers, Inc., of Knoxville, Tennessee, owner of several portable crushing - and - screening plants, is operating at widely scattered areas this spring. One unit is producing for an army-airport job near Rome, Georgia; another is turning out material for an oil-field levee project at Madill, Oklahoma; while still another is engaged in a war-department development near Clinton, Tennessee.

Dalton to Supervise Mississippi's Farm Limestone Plants

Sam J. Dalton of Jackson, Mississippi, former engineer with the Mississippi Highway Department, has been named superintendent of the three portable lime plants provided for by the Legislature at its recent session. Mr. Dalton's selection was made by the State Lime Plant Board, headed by Governor Bailey. He will be general supervisor of the plants which will make agricultural limestone availabe for farmers.

The Legislature appropriated money for the lime plant program and for purchase and operation of three portable units. Two of the units have already been put in operation. Members of the commission are Director L. I. Jones of the Extension Department, Commissioner of Agriculture Si Corley, Experiment Director Clarence Dorman and Chief Engineer A. J. Yates of the Highway Department.



Si Corley, commissioner and secretary, Mississippi Lime Plant Board; Governor Thomas L. Bailey; and Senator Ed McIntyre, who was instrumental in getting an $85,000 appropriation passed by the Mississippi Legislature to complete the state's lime-plant program.

Following a fall in a Minneapolis hotel where he was a guest, Samuel A. Gibson, 77, of Rockford, Illinois, died recently.

For many years Mr. Gibson was manager of the Rockford Sand & Gravel Company and he had many friends in Illinois and Wisconsin.

The long conveyors leading up to the screening plant operated by Roy Green of Grangeville, Idaho, are kept busy carrying a constant stream of material by this Lima Paymaster shovel. It is an extremely mobile unit, being mounted on crawlers, and is equipped with an 18-foot boom, 15-foot dipper stick and ¾-cubic yard bucket.

April Construction Awards Up Slightly Over March Totals

Construction contracts awarded during April were valued at $179,286,000 in the 37 eastern states, according to F. W. Dodge Corporation. This was slightly better than the $176,383,000 recorded in the previous month but 41 per cent. below April, 1943.

Non-residential building totaled $69,491,000 for the month and was below both March, 1944 and April, 1943, while both residential building and heavy-engineering work showed an improvement over the preceding month but were 47 per cent. and 56 per cent. respectively, behind April a year ago.

The largest drop was in the utilities classification which amounted to $31,926,000 this April as compared with $85,841,000 in April, 1943. The second largest drop was in multi-family residential structures which were off $26,021,000 from the $35,280,000 recorded in April last year. These declines were accompanied by an $8,357,000 drop in miscellaneous non-residential buildings and $7,584,000 in shelter construction of the barracks and temporary dormitory type.

Raleigh Granite Plants Under New Management

Operations of the Raleigh Granite Company of Raleigh, North Carolina, have been dismembered and the various quarries and plants of the company and its subsidiaries are now being controlled as follows:

The properties formerly operated by Bryan-Monroe Company, Inc., are being operated as Bryan-Monroe Company, the partnership being James E. Bryan and G. D. Monroe. In addition, the Bryan-Monroe Company has leased the Rockton and Wilson County quarries of the Raleigh Granite Company.

The Greystone quarry is being operated under lease to others under the name of Greystone Granite Quarry, R.F.D. 2, Henderson, North Carolina. The Woodleaf quarry is being operated by the Woodleaf Stone Company, Woodleaf, North Carolina. The Guilquarry plant has been sold to the Guilquarry Stone Company at Stokesdale, North Carolina. The South Carolina Granite Company plant at Blairs, South Carolina has been leased to the Blairs Quarry, Inc., Blairs, South Carolina.

WASHINGTON NEWS LETTER

IT is clear that the cut in the munitions-production program, once the Germans are beaten and our military forces can be concentrated on one front, will be very substantial. In a recent statement Charles E. Wilson, Executive Vice-Chairman of the War Production Board, announced that at the end of the war with Germany 35 per cent. of the industrial capacity of the nation would be disengaged from war work. This estimate, the first which has been made by a responsible government authority, is generally regarded in official Washington as the minimum cut which may be expected. Even a cut of 35 per cent., however, represents the release of facilities now turning out war goods at an annual rate of $25,000,000,000.

A change of this magnitude holds serious potential consequences for the welfare of the national economy, and it is therefore imperative that an adequate program for the utilization of the released resources be carefully worked out so as to be available when needed. Although this kind of X-day planning was one of the key recommendations of the Baruch-Hancock report, the progress made thus far in evolving a suitable program has been of minor significance. A hint as to the reason for this lack of progress may be found in the rest of Mr. Wilson's statement, which was made before the Automobile Labor Advisory Committee. He stated that we really need three plans: one for war production, which he clearly considers the most important; another involves "carrying out essential civilian production coincidentally with war work"; the third is the long-run program for full production and full employment after the war. He concluded by emphasizing that only preliminary planning for reconversion is possible until the invasion of Europe has reached a decisive stage. Used in this sense, reconversion planning does not refer to long-run peace-time planning alone; it covers also the period of one-front warfare in the Pacific. It must also be noted that "preliminary planning" is notorious Washingtonese for token planning. In other words, Mr. Wilson is saying that until the European war is a clear-cut success it is undesirable to plan seriously for the period which will follow.

This attitude is a resultant of Army and Navy pressure to forestall major policy determinations by the War Production Board on reconversion matters, pending a satisfactory appraisal of the prospects of military operations on the European continent. While it is not particularly difficult to appreciate the position of the armed services who, after all, bear the responsibility for winning victories on the battlefield with the minimum attrition to our own fighting men, no impartial judge would consider this sufficient reason for failing to formulate and have in readiness detailed economic plans under a variety of assumptions as to the course of the war. Furthermore, a postponement of realistic planning of the mechanics of reconversion means that the problems will be all the more intensified once the bars are let down; this will be particularly true if the war against Germany should end suddenly. It is common sense, not wishful thinking, to be prepared for just such an eventuality. This is the most eloquent argument for sound planning now—not just "planning" in the abstract, to which everyone gives lip service, but realistic programming of the specific what-where-when-why-how variety.

The chief difficulty to date has been the tendency of the military services to bury their heads in the sand, so far as their economic responsibilities are concerned. The Secretaries of the War and Navy Departments are also members of the War Production Board, and their influence on Messrs. Nelson and Wilson is apparently such that the latter feel impelled to go along with the military dictates. The problem is further complicated by the constitutional resistance of many people to hypothetical planning. Thus, the armed forces must make a series of alternative assumptions as to the duration of the European war, its cost in men and materials, the status of other operations at the time the European war is concluded, and various other factors, in order to determine their future needs for war goods. In all fairness, such estimates are not easy to arrive at. Finally, from the strictly military point of view, no harm is done by deciding to "wait and see," since in any case war demands would be given precedence over all others.

In the months following the defeat of Germany serious inflationary and deflationary tendencies will be present in the economy. These dangers can be largely reduced if reconversion is speedy, efficient and, above all, orderly. The importance of careful planning in achieving these ends should be self-evident to all. A good deal of behind-the-scenes tugging and pulling still surrounds the problem in Washington, and much valuable time has been lost.

The International TD-9 Diesel TracTracTor with 1/2-cubic-yard front-end loader shown is providing a quick and efficient means of loading and speeding motor trucks on their way for the Beyer Crushed Rock Company of Kansas City. Four such units are being used not only out in the open as shown for loading rock that goes to the crushing plants but also for underground loading, limestone being thus produced from several tunnels or mines 1/4 mile in length. The rock is crushed in sizes for various building and construction purposes and also as agricultural limestone. Louis Marino is president of the Beyer Crushed Rock Company.

the VICTORY *Program*

. . . . . AND YOUR BUSINESS

CONSTRUCTION ORDER REVISED.—Conservation Order L-41 has been amended to exclude public highway and street construction under the jurisdiction of a federal, state or other government agency, the War Production Board announced April 19. Such construction will hereafter be governed by the issuance of a specially applicable order L-41-e.

The basis construction order L-41 limits all types of construction work. Because of the differences of terminology employed in building and road construction, a special adaptation written to apply specifically to public highway and street construction in attaining the objectives of the basic order L-41 has been found necessary. Both orders become effective April 19.

Other changes of a minor nature are made in Order L-41 as follows:

Direction 2 to Order L-41 is amended to provide that permission granted for the installation or relocation of machinery and equipment does not apply (1) where the machinery or equipment is for use in the future manufacture of items which at the time of installation are prohibited by an outstanding order of the War Production Board, or (2) "in connection with construction of a kind which is limited by Order L-41. If permission under Order L-41 is required for the job, the materials for the installation of any equipment to be installed as part of the job must be obtained under the project authorization and not under this direction." If an application is necessary, the entire project must be covered by the application.

For example, if a new building is constructed under a project authorization, permission to install machinery in the building must be obtained under the authorization. Also, if the conversion of a building from one use to another involves both building alterations for which permission is necessary and the installation of machinery, permission to install the machinery involved in the conversion must be obtained under the project authorization and not under Direction 2 to Order L-41.

Construction allowed without the necessity of obtaining W.P.B. permission is somewhat tightened in the case of farm construction. The permitted allowance of $1,000 for a farm including the farm (dwelling) houses continues, but according to the terms of the revised order not more than $200 of this amount may be expended on any farm house on a farm property. The term "farm" is defined.

The erection of farm silos manufactured by a producer under the terms of Limitation Order L-257 has been added to the list of exceptions for which W.P.B. permission is not required under Schedule B. It is felt that the limitations placed on the manufacture of farm silos by Order L-257 have proved sufficiently restrictive for the conservation of materials and labor and that further restrictions on their erection should be removed from Conservation Order L-41.

Order L-41 was further amended to exempt certain railroad construction jobs including tunnels, overpasses, underpasses, or bridges where the cost of materials is $2,500 or less. Formerly this exemption was not allowed. Construction of this type is now controlled under the provisions of Order P-142 amended. The construction of tunnels, overpasses, underpasses, or bridges where the material cost is more than $2,500 and the construction of railroad stations, warehouses, loading platforms and other similar structures are not exempt, and will still require W.P.B. permission under Order L-41.

Except for the changes mentioned, the amended order does not differ greatly from the text given in these columns recently (*P & Q*, December, 1943, pages 99 to 51). L-41-e, however, being new, is reproduced below.

PART 1075—CONSTRUCTION
[Conservation Order L-41-e]

PUBLIC HIGHWAYS AND STREET CONSTRUCTION

§ 1075.16 *Conservation Order L-41-e*—(a) *What this order does.* The basic order, Conservation Order L-41, limits all types of construction work. This order, L-41-e, is a special adaptation written to apply specifically to public highway and street construction in attaining the objective of the basic order L-41; namely, the conservation of materials, construction equipment, labor and transportation. The governmental agency responsible for the proposed construction must get permission from the War Production Board to begin to work, unless it is of a kind which does not require permission, as described below in paragraphs (c) and (d). This permission, generally known as an "authorization to begin construction," should not be confused with preference ratings or priorities. If a road project is allowed, either because it is not of the kind restricted by this order or because permission has been obtained, it may still be necessary to get preference ratings and allotments for certain materials which will be required. On the other hand, if preference ratings have been obtained or if materials are on hand, it may still be necessary to get permission to begin construction of the project.

(b) *What is meant by the construction of a public highway or street.* A public highway or street is one which is open to the public and which is constructed and maintained by any Federal, State, territorial, county, city, district or other governmental agency. Construction of a highway or street includes the grading, draining and surfacing of the highway or street; erecting of bridges, grade separation structures, culverts, storm drains and similar structures; installing safety and control devices; and constructing curbs, gutters, sidewalks and other appurtenances.

(c) *Maintenance or repair of highways or streets does not require authorization.* It is not necessary to get permission from the War Production Board to perform maintenance and repair work on highways and streets. The kind of work which may be classed as maintenance and repair is as follows:

(1) Maintenance includes only the usual operations necessary from time to time to keep surfaces, shoulders, embankments, slopes, structures, rights-of-way and all appurtenances of a public highway or street in a safe and serviceable condition, such as blading and shaping surfaces and shoulders, cleaning ditches and waterways, patching, and the like.

(2) Repair consists of work necessary to make serviceable a damaged or deteriorated portion of a highway or structure or to restore it to its original condition or the equivalent. It does not mean reconstruction or even replacement. Repair does not include work which represents an improvement or departure from original types of construction. Examples of work which may be classed as repair include the replacement of damaged members or parts of highway bridges or grade separation structures; rehabilitation of deteriorated surfaces on graveled or earth roads, on existing line and grade, by the application of dust palliatives and bituminous preservative treatments; the rehabilitation of deteriorated surfaces on bituminous-surfaced roads, on existing line and grade, to restore such surfaces to their original condition or equivalent, including resurfacing not over 1½ inches in thickness; the rehabilitation of deteriorated surfaces on concrete or brick roads, on existing line and grade, by the application of wearing courses not to exceed 4" in nominal thickness for non-rigid types, or 5" in nominal thickness for rigid types; widening of surfaces where necessary to reduce serious traffic hazard or excessive shoulder maintenance when such widening does not provide additional traffic lanes, or require increase in the width of roadbed. Examples of work which may not be classed as repair include changes in line or grade; reconstruction of foundation, base and surface, except as may be incidental to patching preliminary to resurfacing; widening for the purpose of providing additional traffic lanes, reconstruction or replacement of bridges destroyed by fire or flood or other cause. Maintenance and repair are to be considered in terms of the kind of work to be done and not in terms of the method of doing it or of financing it. For example, the repair of a bridge floor is a repair operation even though it is done by a contractor and financed from the construction budget. On the other hand, the replacement of an old bridge with a new one is construction, not repair, even though the work is done with repair maintenance forces and is financed with maintenance funds.

(d) *Size and kind of highway and street construction which does not require authorization.* Highway and street construction may be started without specific War Production Board project authorization if the work consists of one or more of the following classes:

(1) A project costing $5,000 per mile or less providing the aggregate cost of the project does not exceed $25,000.

(2) A project costing $10,000 or less.

(3) A project providing access to sources of raw materials as provided for in section 6 of the Lefense Highway Act of 1941 (55 Stat. 765, as amended) when such project is certified as essential to the war effort by the War Production Board.

(4) Highway construction owned by the United States Army, Navy, Maritime Commission, War Shipping Administration, Coast Guard, Marine Corps, Civilian Aeronautics Authority, Coast and Geodetic Survey, or Panama Canal.

(e) *All other public highway and street construction forbidden without War Production Board permission.* No person shall do any construction on a public highway or street which has not been permitted by the War Production Board, unless it is of a kind described in paragraphs (c) or (d) above. This prohibition applies to a Governmental Agency which does its own construction work, to one who gets others to do the work for it, and to any contractor or subcontractor who works on the job or gets others to work on it. It also applies to any supplier who furnishes material for the job if he knows or has reason to know that the construction has not been permitted.

(f) *How to apply for authorization.* The governmental agency responsible for the construction should file an application through the State Highway Department. This application also covers the matter of preference ratings and controlled materials allotments if these are required for the construction. The form is called "Application for Authority to Construct Public Highway or Street, Form PR.1-PA", and copies are obtainable from the State Highway Department or the U. S. Public Roads Administration. Authorizations for road construction will be made on Form GA-1456.

(g) *How to figure cost.* (1) For the purpose of determining whether construction may be started on a highway or street without permission of the War Production Board, cost means the cost of the whole job as estimated at the time of beginning construction, except that the cost of used materials or used fixtures may be disregarded.

(2) If any materials or fixtures which have not been used are obtained without buying them their value must be included as part of the cost.

(3) The cost of labor must be included, but if labor is unpaid its value need not be included. Contractors' fees also must be included, but architects' and engineers' fees need not, nor need the cost of administration.

(4) The cost of the right-of-way, that is the amount paid for the land, whether by purchase or condemnation, need not be included.

(5) All construction on the same project must be included. The word "project" includes all contiguous construction. It also includes all jobs on a street or highway between principal intersecting highways or streets. No project may be split into a number of projects to avoid the provisions of this order.

Issued this 19th day of April, 1944.

WAR PRODUCTION BOARD,
By J. JOSEPH WHELAN,
Recording Secretary.

LUMBER.—Mine and smelter operators holding serial numbers under Order P-56 may obtain restricted southern yellow pine and hardwood lumber by certification of purchase orders instead of getting War Production Board authorization, WPB announced April 21. This simplified procedure is established by Direction 6 to Order M-361 (southern yellow pine) and M-364 (restricted hardwoods).

Under the terms of the orders the re-

stricted lumber may be sold only to certain federal war agencies, their contractors and others designated by them; to federal agencies purchasing for Lend-Lease; and to persons who have received WPB authorization either through approvals of applications on WPB Form 2720 or through directions to the orders.

Direction 6 permits serialized mine and smelter operators to use a certificate if they so desire. The operator need not confine himself to one of these procedures, but may use either from time to time as is most convenient.

Serialized mines and smelting plants use approximately 175,000,000 board feet of lumber per quarter. Southern yellow pine accounts for 39,000,000 board feet or 22.6 per cent. of the total quarterly requirements, and restricted hardwoods account for 55,000,000 board feet or 31.7 per cent.

Because the operators can not segregate lumber used for shipping and for maintenance and repair, all the lumber required may be obtained through certification. However, certification may not be used to get more lumber in a calendar quarter than was used in the corresponding quarter of 1943.

Direction 6 is designed primarily to reduce paper work both for the operators of mines and smelters and for the Lumber and Lumber Products Division, WPB said.

TRACTORS.—Only half of the non-military requirements for track-laying tractors can be met out of current production in the year ending April 1, 1945, the War Production Board reported May 8. The requirements for this period and the allocation of production for military and non-military use were discussed at the meeting of the Track-Laying Tractor Industry Advisory Committee.

Tractors are grouped according to horsepower into five classes: Class 1: 87 horsepower and over; Class 2: 65 to 86 horsepower; Class 3: 50 to 64 horsepower; Class 4: 35 to 49 horsepower, and Class 5: 17 to 34 horsepower.

According to the present pattern of distribution, up to 85 per cent. of the Class 1, 3, and 4 tractors produced in each quarter is reserved for military use. Up to 85 per cent. of the production of Class 2 tractors in the second and third quarters, 1944, and up to 75 per cent. of the production of Class 2 tractors in the fourth quarter, 1944 and the first quarter, 1945, is reserved for the military. The actual number of tractors allocated depends on production, WPB officials said.

The heavy military demand and the consequent shortage of new tractors for civilian use make it highly necessary to put all idle used tractors into active service, the committee was informed by WPB. Lists of used tractors and other construction equipment available for sale or rental are maintained in WPB field offices and are kept up to date.

Building Volume Lower Than Early Estimates

Success in cutting back construction projects for 1944 to a larger degree than had been anticipated, has been reported by the War Production Board. The total volume of construction this year is not expected to exceed 3,500,000,000, as contrasted with the $3,900,000,000 estimate made last fall.

The 10-per cent. reduction in expected construction will materially help to conserve scarce lumber as well as supplies of steel and copper, which are becoming increasingly tight, and is regarded as a welcome relief to the war economy, the WPB said.

The total volume of construction activity in the United States in the first quarter was under $900,000,000, which is less than 40 per cent. of the volume of construction put in place in the corresponding quarter of 1943. The March rate is expected to be slightly exceeded in the second and third quarters as seasonal increases will more than make up for declines in military and war plant expansion. The volume of plants complete or substantially complete increased to approximately $10,000,000,000 during March, or 64 per cent. of the cumulative program to date. Nearly $450,000,000 of projects were completed during this month. Over two-thirds of the value of these projects was in the aircraft and non-ferrous metals categories.

The total volume of construction activity in March was $288,741,000, a 2-per cent. decline from the February volume. This volume comprised the four major classifications: (1) total military, $56,597,000; (2) industrial plant expansion (government and privately financed) $71,844,000; (3) housing (government and privately financed) $62,300,000; and (4) all other construction (public and privately financed), including public roads, sewer and water, community buildings, farm utilities and other non-residential, $98,000,000.

The March activity brought the first quarter volume to $896,988,000, or 38 per cent. of the $2,367,000,000 volume of work put in place during the first quarter of 1943. April activity is expected to hold or slightly exceed the March volume, interrupting the continuous downward trend in over-all activity which has been recorded since August, 1942. The total activity in the second and third quarters of 1944 will be slightly above that of the first quarter as continued decreases in work at military establishments and war industrial plants are more than compensated by seasonal gains in the restricted normal construction categories such as civilian housing, highways, utilities, farm construction, etc.

Military construction as a whole (troop housing, hospitals, airfields and bases, storage facilities, etc.) declined 18 per cent. in March and totaled $56,597,000, making the total activity for the quarter $204,477,000 as compared with the $918,000,000 volume of the first quarter of 1943. Military-housing work continued to drop in March, 28 per cent.; aeronautics construction declined 18 per cent., and other military work 9 per cent.

Housing activity in March continued to decline 4 per cent., with government-financed housing down 12 per cent over the month, and private work holding the February level. In April privately-financed housing is expected to show a seasonal gain of 5 per cent. with government-financed work declining 17 per cent.

All other construction amounted to $98,000,000 in March, a 10-per cent. increase over February, and making a total for the first quarter of 1944 of $274,000,000, as compared with $324,000,000 in the first quarter of 1943. This category includes highways, community buildings, sewer and water, utilities, farm, and other non-residential construction. An over-all seasonal gain of 4 per cent. is estimated for these types of construction in April.

Revised estimates for 1944, based on the assumption that present policies affecting construction will remain in force and that total war will continue through 1944, indicate a volume of construction in the United States of $3,500,000,000 or 46 per cent. of the 1943 and 26 per cent. of the 1942 volume. Declining activity is anticipated in all types of construction with the sharpest drop occurring in non-industrial military construction which is expected to decline to about $770,000,000 or 29 per cent. of the 1943 work and 15 per cent. of the 1942 total in this category. Government-financed industrial construction is expected to be 30 per cent. of the 1943 volume of activity, with machinery and equipment deliveries down to an estimated 35 per cent. of the 1943 volume. Housing, privately-financed industrial work, and other types of construction are expected to show more moderate declines.

Flexibility in Grading and Storage Methods Feature of Eastern Plant

THE recently redesigned plant of the Highland Sand & Gravel Company at Dedham, Massachusetts, is a sand-and-gravel operation of peculiar flexibility. Conducted almost entirely as a wholesale source of supply for ready-mixed-concrete plants, it can produce mixes of any desired percentage of sizes, as well as uniformly sized materials.

Normal production is at the rate of approximately 150 tons per hour, varying with seasonal demands. Except for two 120-ton Blaw-Knox cylindrical storage hoppers for ¾-inch stone and concrete sand, respectively, ground storage is used for all material produced.

The operation is located on a 52-acre tract from which 2 to 3 feet of overburden is stripped with an RD-8 Caterpillar tractor equipped with a bulldozer. Working at a 15-foot pit face, a 75-D Lorain shovel, powered with a Waukesha gasoline motor and using a 1¼-cubic yard Amsco dipper, loads rented trucks for the one-eighth mile haul to the plant.

Climbing a gently sloping ramp, the trucks dump bank-run material through an I-beam grizzly with 12-inch openings into a 15-ton wooden hopper. Beneath this hopper is a Link-Belt reciprocating-plate feeder driven off the tail pulley of a 30-inch, 6-ply rubber conveyor belt on which the bank-run material is fed. The belt is driven by a 15-horsepower motor, the electricity for this, as for the entire plant, being 220-volt, 60-cycle, 3-phase.

One of the two sand tanks.

General view of plant as seen from edge of pit.

Supported on an Anderson Engineering Company steel angle frame and running on Chain Belt idlers and Anderson head and tail pulleys, this 30-inch belt runs to a No. 36 Telsmith rotary grizzly which has 2½-inch openings between its rings. The grizzly, driven off the head pulley of the conveyor belt which feeds it, has a capacity at this opening of about 190 tons per hour. Fine aggregate, scalped out by the grizzly, falls on a 24-inch main belt-conveyor.

Large aggregate rejected by the grizzly then falls on a sloping rail grizzly which has 2-inch openings, the fine aggregate scalped out also falling on the 24-inch belt.

Coarse aggregate from the rail grizzly falls into a 13- by 24-inch Model 13B Farrel-Bacon jaw crusher which is driven by a 50-horsepower motor. Crushed material falling through the 2½-inch setting of its discharge opening also falls on the 24-inch belt.

This main conveyor has a 6-ply rubber belt which runs on Link-Belt idlers and over Dodge head and tail pulleys, and is driven by a 15-horsepower motor.

At the top of the plant the main belt discharges its load down a chute and under three heavy streams of water which come from three 2-inch pipes with their bottom ends flattened. The water for this initial flooding of the material, as well as for subsequent screen sprays, comes from two ponds. From the first the water is raised 6 or 8 feet into the second pond by means of a 750-g.p.m. Fairbanks-Morse auxiliary centrifugal pump driven by a 5-horsepower motor. From the second, or higher, pond the water is raised to the plant with a 1,000-g.p.m. centrifugal pump of the same make driven by a 50-horsepower motor.

The mixture of gravel, sand and water then flows on a 4- by 8-foot Seco double-deck vibrating screen driven by a 5-horsepower motor. On the upper half of the top deck is 1½-inch and on the lower half is 2-inch hexagonal perforated metal. Material scalped off the top deck (plus-2-inch) slides down a chute and into an Allis-Chalmers 6-inch McCully reduction crusher which is driven by a 50-horsepower General Electric slip-ring motor.

The material from this crusher is returned to the main belt by a 16-inch belt-conveyor driven by a 5-horsepower motor.

Material passing through the 1½-inch and 2-inch openings of the top deck, and rejected by the bottom deck, is either recrushed in an Allis-Chalmers 322-R fine-reduction crusher, driven by a 30-horsepower motor, or chuted down on a 16-inch Anderson stacking belt-conveyor, 120 feet long and driven by a 5-horsepower motor, to be dropped on the minus-2-inch stone stock pile. Whether this minus 2-inch material is recrushed or stock-piled depends

The pit shovel loading a truck.

By SPENCER JONES

on the amount fed down the chute to the fine-reduction crusher. If too much is being fed, the surplus overflows automatically from the side of the crusher feed chute and slides down another chute to the minus-2-inch stone-stacking conveyor. The amount of minus 2-inch stone produced is, therefore, a variable and might almost be classed as an overflow by-product.

Recrushed material from the fine-reduction crusher with the recrushed material from the 6-inch McCully crusher, also falls on the 16-inch recirculating belt previously referred to and is conveyed back to the main belt.

Loader at the ¾-inch stock pile.

The bottom deck of the Seco vibrating screen has its upper half covered with ⅞-inch and its lower half with 1-inch square wire mesh. All the material passing through these two meshes goes down a pair of chutes to two 3- by 6-foot double-deck Type 300 Tyler-Niagara vibrating screens. Over each of these sizing screens are three water-spray bars. Each of these screens is driven by a 5-horsepower motor.

On the top decks 5/16-inch square wire mesh is used. The upper one-third of the bottom decks has ⅛-inch square wire mesh, the center third is covered with 3/16-inch by 1-inch, and the lower third has ¼-inch square wire mesh.

One of these Niagara screens is more than 12 years old; the other is more than 10 years old, each having handled about 150 tons per hour since it was placed in service, which means that the older screen has probably sized about 3,000,000 tons of material and the younger one about 2,500,000 tons. The repairs have been almost nil.

The material rejected by the top screens slides down chutes to the ¾-inch stone-stacking conveyor and is carried to the ¾-inch stone stock pile. The material rejected by the three different-sized bottom screens is chuted to the roofing (or "pea gravel") stacking conveyor and is carried to the roofing-stone stock pile.

The material passing through the ⅛-inch mesh of the bottom decks flows into a No. 8 Telsmith sand tank, thence into a Telsmith twin-screw fine-sand classifier driven by a 10-horsepower motor. Sand from the classifier is chuted to a plaster-sand stacking conveyor and is carried to the plaster-sand stock pile.

The materials passing through the 3/16-inch by 1-inch and the ¼-inch openings of the bottom decks flow into two No. 8 Telsmith sand tanks, thence into a Telsmith twin-screw coarse-sand classifier driven by a 10-horsepower motor. Coarse sand from the latter classifier is chuted to a stacking conveyor and is carried to the concrete-sand stock pile.

Two 3- by 6-foot vibrating screens.

Adding the first wash water through flattened-end pipes as the material slides down chute from main belt to screen.

The three stacking conveyors are all 120 foot long, 18-inch belts driven by 5-horsepower motors. The concrete-sand and plaster-sand conveyors are 125-foot long, 24-inch belts driven by 7½-horsepower Continental motors. All the stacking conveyors were designed and built by Anderson Engineering Company.

The 4- by 8-foot double-deck screen. Top-deck oversize goes to the reduction crusher.

An ingenious system of chute design makes possible the mixing of any two or more sizes of sand and stone to produce whatever mixture is demanded by a customer. As will be noted, no bin storage is used, except the two 120-ton Blaw-Knox bins for ¾-inch stone and concrete sand, which are filled by a Lorain 60 crane which is powered by a Waukesha gasoline motor and swings a 1¼-cubic-yard clamshell bucket from the end of its 45-foot boom.

All the shipments of finished products are made by motor trucks and the weighing is done on a 20-ton Fairbanks-Morse platform scale. Because of the considerable amount of truck loading to be done, there are four ways of loading out: from either

(*Continued on page* 60)

Drilling and Blasting Practices in the Lehigh Valley District*

By H. I. PHEMISTER

Manager, Technical Service, Explosives Department, American Cyanimid & Chemical Corporation.

SINCE the year of 1850, when D. O. Saylor first burned cement rock on a cook stove at Coplay, Pennsylvania, and ground the product at a near flour mill, the problem of drilling and blasting cement rock has been a major item in the Lehigh cement district. Little did Saylor and his associates realize that by this date, millions of barrels of cement would be produced annually in this area and that 1,500,000 pounds of explosives would be consumed annually in primary and secondary blasting operations.

The early records state that the discovery of natural cement rock in the United States was made by Canvas White near Fayetteville, New York, in 1818. The extracting of the rock was done by pick and bar and it was broken by means of sledge hammers. Alternate layers of rock and coke were charged into vertical kilns, 8 to 10 feet in diameter and having a bar-grate bottom, where the calcined rock could be drawn off. The success of this material in the building of the Erie Canal and the rapid development of other engineering projects led to a widespread plant-building program in the cement industry. Even though these plants were small, all the operators were confronted with the problem of drilling and blasting the rock.

As essential as the discovery of cement was to our present state of advancement, the discovery of explosives marks one of the most important findings in the history of civilization. Without explosives the building of railroads, the driving of tunnels, the construction of canals and other great engineering feats would have been greatly handicapped.

Roger Bacon is credited with the discovery of gunpowder in 1242. Since he was thrown into prison for this discovery, it was not until 300 years later that his findings were applied to mining and quarrying.

Nitroglycerine was accidentally discovered in 1846 by Sobrero, an Italian chemist, who was studying the action of strong nitric acid on various organic compounds. Due to the treacherous characteristics of the newly discovered oil, he warned the world against attempting to convert it to industrial use.

Seventeen years later Nobel announced that nitroglycerine could be successfully used as a blasting agent and demonstrated its use in blasting granite. The use of Nobel's blasting oil rapidly spread to many countries. A series of disastrous accidents led to the enactment of laws restricting or prohibiting the manufacture of nitroglycerine. In 1866 Nobel announced a safety type explosive which he called dynamite. It was nitroglycerine absorbed in kieselguhr.

In 1872 the Atlantic Giant Powder Company started manufacturing nitroglycerine dynamite near Dover, New Jersey. Only two grades were offered, namely, 75-per cent. strength at $1.00 per pound and 40-per cent. strength at 50 cents per pound. Much more efficient and safer explosives of equivalent strength can be purchased to-day for approximately 1/6 of these prices.

The first percussion drill was patented by J. J. Couch in Philadelphia in 1849. Several patents were issued on similar types of drills operated either by steam or compressed air. It was not until 1861 that this type of drill was considered successful.

Crawler-mounted well drill in operation.

Tripod for lowering large-size cartridges.

The early quarry operators now had two mechanical methods of extracting rock which replaced the original hand methods, namely, drills and dynamite.

One of the early typical quarries in the Lehigh Valley district was that of the Bonneville Company started in 1889 at Northampton, Pennsylvania. The drilling was done by steam piston drills. Two and one-quarter-inch steels were used to drill holes 15 feet in depth. The face was carried in a series of benches and by 1907, when this company ceased to operate, the quarry was 135 feet deep.

About 1911 the first steam-driven churn drill was introduced into this region. Faces were established at various heights and a gradual change has been made from 15-foot faces to a single face ranging from 20 to over 250 feet in height. The present-day churn, or blast-hole, drills are usually electrically driven, although a few gas engine-driven drills are still in use.

The standard hole diameter for this area is 6 inches. The drilling

*Presented at the meeting of the Industrial Minerals Division, American Institute of Mining and Metallurgical Engineers.—Ed.]

speed varies for different quarries through a range from 2 to 8 feet per hour with an average of 5. Different types of cutting bits are used, although the most common are the Gill and California types. These bits are sharpened either by hand or by machine. One operator recently found that, by changing the style of cutting bit, the footage could be increased 50 per cent. per hour.

For primary drilling on low faces the most economical drill in use is the wagon drill. This is a heavy-duty type jackhammer mounted on a wheeled carriage. This type of drill has been successfully used on faces up to 40 feet in height, although 20 feet is usually the maximum height of face drilled in this manner. The wagon drill has generally replaced the tripod-mounted drill for snake-hole and toe-hole types of drilling.

The spacing-to-burden ratio for the average well-drill hole in this section is difficult to determine since it varies from 12 feet by 12 feet for

Lowering Primacord-initiated primer.

a 30-foot height face to 20 by 32 feet for a 245-foot face, although the common ratio approaches 18 by 24 feet. Each quarry has a spacing-to-burden ratio of its own. So much depends on the stratification of the rock, resistance to blasting, shovel and crusher sizes and type of haulage equipment that the ratio is often determined by one of the above factors rather than the most efficient use of explosives.

The trial-and-error method of blasting in this region has now given way to more systematic methods of shooting. Surveys of quarry faces are now made and base lines established so that, once the correct spacing-to-burden ratio is determined, a definite blasting pattern can be followed. As heretofore mentioned, this ratio varies considerably for different quarries and even for different sections of the same quarry.

The usual hole depth is from 3 to 5 feet below the floor level. In one quarry it was common practice to drill 15 feet below the floor level in order to pull the bottom. It was later found that, by changing to a different grade of explosives for the base charge, the sub-drilling could be cut to 5 feet. Sub-drilling is the usual method of pulling the bottom, although in a few instances, where vibration and shock-wave transmission have to be considered, the practice is to drill to the floor level and spring a pocket at the bottom of the hole, sufficiently large to accommodate the necessary charge. In one allied quarry this amounts to 1,000 pounds in the first 10 feet for a 30-foot burden on an 180-foot face.

When well-drill shooting was first introduced into this area, the standard large-size cartridge of explosives was 4 inches in diameter and 8 inches in length. Due to increased safety factors incorporated in the manufacture of explosives and to the necessity of saving time in loading operations, the standard-size explosive cartridge now used for 6-inch holes is 5 inches by 16, 24 or 30 inches.

The explosives charge ratio for the cement area varies from .43 to .85 pound per cubic yard of rock. The base charge is usually of 60-per cent. strength with finishing charges of lower-strength explosives. In some severe shooting sections 75-per cent. strength is used for the bottom charge.

Safety regulations at some operating companies dictate how the explosive is to be charged into the hole. The most common method is to lower the cartridge by means of a hand rope or, in the case of deep holes, a tripod-mounted drum. Where holes are smooth and dry the cartridges are sometimes dropped. A few quarries follow the practice of cutting the explosive in small pieces and dropping it into the hole.

Explosives charges are detonated either by electric blasting caps or by Primacord. It is good practice to use two electric blasting caps for each separate charge in the drill hole. The caps in the holes are hooked up in series and the holes paralleled, provided there is sufficient current available. In instances where the source of power is a hand-operated blasting machine all the caps are hooked up in series.

Many operators in this area use Primacord as the detonating agent. This product has taken the place of Cordeau, formerly used. Primacord is attached to the first cartridge charged into the hole and extends to the top of the hole. A trunk line is used to connect the individual holes. It can be detonated either by an electric blasting cap or a fuse and a cap. The direction of throw of the rock can be controlled, within limits, by the use of Primacord. This is advantageous in blasting near fixed objects.

The foregoing applies to cement quarries in this region. There are a few allied quarries in this area; namely, slate, sand and trap-rock quarries. Trap rock offers the greatest resistance to blasting, therefore, it is common practice to spring or pocket the holes along with sub-drilling.

The average charge ratio for trap rock is .7 to .9 pound per cubic yard. Two quarries follow the practice of shooting one-hole shots. By proper location of the hole large tonnages are blasted by a single hole and in some very favorable instances the charge ratio has been as low as .25 pound per cubic yard. The diameter of the hole drilled is usually 8 inches. The drilling speed in trap rock varies from ½ foot to 2 feet per hour.

In two near trap-rock quarries the tunnel or coyote-hole method of blasting is used. A small pilot tunnel is driven at right angles to the face to a depth of from 40 to 50 feet, at which point lateral tunnels are driven right and left at right angles. These lateral tunnels are

Opening explosives box with a wooden mallet and wedge.

often 125 feet in length. Charges of explosives are placed at different points in the laterals and are confined in the usual manner with stemming. In a recent blast at one of these quarries a total burden of 80 feet was pulled at one time by using two sets of parallel laterals driven from the pilot tunnel. Tunnel blasting is usually done on high faces or where the surface terrain is rugged. In instances where tunnel blasting is adaptable large tonnages can be broken in a single blast and usually at very low explosives ratios. This low ratio is often offset by high secondary-blasting costs.

Lead tamping block for opening blocked holes.

One very interesting method of blasting was observed in this survey where a deposit of uniformly stratified sand pitches at 60 degrees to the horizontal. The vertical height of the face is approximately 300 feet. A single row of 2½-inch diameter snake holes are drilled horizontally on 14-foot spacings through a ledge 20 feet in thickness and bottom on a parting. The holes are sprung to chamber the charge and also to open the numerous cracks in the strata. Free-running types of explosives are blown into the holes with compressed-air blow pipes. The air escapes to the surface and the explosive is deposited in the many crevices as well as the pocket. When these holes are shot, the bottom is blown out and the ledge, up the entire slope distance, slides into the quarry pit. Excellent fragmentation is obtained at a very low explosive cost.

Slate quarrying in this area has practically developed into a non-blasting operation. The more progressive producers use a wire saw for the primary removal operation, and reduce to secondary and final sizing by means of 3-piece wedges. If blasting is done, it is for lifting the section already severed by sawing. Two pounds of black powder will lift a 60- by 30-foot section 8 feet in thickness, but it bruises the slate to a depth of 8 to 12 inches from the hole. This is waste. Since slate breaks readily along the bedding planes, the mechanical method of blasting is far more desirable.

As a result of years of continued research, explosives consumers today are enabled to purchase a product far safer, when properly used, than that first offered in 1872. At that time much horror was coupled with the word "dynamite." Railroads refused to carry it and salesmen were forced to resort to sideshow tactics in order to sell their products. One of the original explosives salesmen wrote that, in order to demonstrate its safety, he would hold a stick of dynamite in his hand and light it with a match, and after burning part of it he would extinguish the fire and put it back in his bag.

Explosives research chemists have now produced explosives that are non-freezing, relatively insensitive to shock and friction, and stable when stored under proper conditions. The stability of structure assures the user of repeated satisfactory blasts from properly loaded shots.

Explosives manufacturers can incorporate safety in their product only to a certain degree. It is equally important for the consumer to use proved methods in handling the product in order that safety may be assured.

To supplement safety in handling the explosive should be properly stored. Wood mallets and wood wedges should be used in opening the boxes. The cartridges of explosives and items of blasting supplies should be handled with care. In loading holes it is advisable to lower all the cartridges. When the holes become blocked, wood or lead tamping blocks should be used to open them. Smoking, open fires, or even gasoline-operated engines should not be permitted in the loading area.

In electrical firing the lead line should be tested for possible electric or stray currents before hooking up the shot. Loading operations should be suspended in the event of an electrical storm. Rubber-soled shoes are recommended for all loading crews. All blasts of material size should be made under the direction of an explosives supervisor, and it should be his duty to see that *Efficiency with Safety* is practiced during the loading operation.

Highland (*from page 57*)

of the two Blaw-Knox cylindrical bins by gravity, with the Lorain 60 crane from the stock piles, at about 4 tons per minute, and with a Barber-Greene loader which is powered with a Buda gasoline motor and loads out from the stock piles at the rate of about 2½ tons a minute.

Thomas McCormick, plant foreman, and German shepherd dog owned by the daughter of George S. Wilbur, company president.

The Lorain crane is also kept busy rehandling sand and stone, particularly sand, when not engaged in loading trucks. At this work it handles as much as 6 tons per minute.

All the electric motors, except those driving the concrete-sand and plaster-sand conveyors, and the one driving Allis-Chalmers McCully reduction crusher, were made by Fairbanks-Morse.

George S. Wilbur, the founder of Highland Sand & Gravel Company, is president; Arthur C. West is treasurer and general superintendent; and Thomas McCormick is foreman of the Dedham plant.

Vulcan Iron Works, Wilkes-Barre, Pennsylvania, announces the appointment of E. J. McSweeney as president succeeding E. Perry Holder, who resigned several months ago to become President of the Wickwire-Spencer Steel Company. Mr. McSweeney was formerly vice-president of the Baltimore & Ohio Railroad.

The Dewey & Almy Chemical Company has won, for the second time, the Army-Navy Production Award for meritorious services on the production front.

Two spreader trucks liming a field of clover 20 miles distant from the plant.

Nearly All of Plant's Agstone Output Sold on Spread Basis

THE Nellis Limestone Quarry, Ripon, Wisconsin, is confronted with the same problem as most other producers of agricultural limestone, a demand for this product far in excess of its ability to produce. Located in the heart of a rich agricultural area, 20 miles west of Fond du Lac, this company holds, for the third consecutive year, a Federal contract to supply agstone to farmers in Green Lake County and part of Fond du Lac County. Its plant, when built in 1930, produced chiefly crushed stone but in recent years agricultural limestone has become

The limestone pulverizer.

the main product. Of the 175 tons of material now being produced daily 125 tons is agstone and the annual output of this material now exceeds 28,000 tons. The pulverizing department is operated from 15 to 16 hours daily to process the 10-hour output of the quarry and crushed-stone plant.

The company's problem is complicated by the fact that most farmers still insist on buying the limestone they need during the spring and fall seasons when the ground is soft and spreading is difficult. These surges of demand are being evened out, however, through the efforts of producers, county agents, federal agencies, etc., to inform farmers of the advantages of doing as much as possible of this work during the in-between periods. Now much of the spreading is done during the summer on clover pastures, or on corn fields.

Most of the farmers in this area are not equipped to do their own spreading, or do not want to bother with it, with the result that the company spreads over 90 per cent. of the agstone it sells. The company owns three Baughman 5-ton truck-spreaders, the oldest one 3 years old, and these, according to R. J. Nellis, owner of the company, have been a very profitable investment. The company adds 40 cents per ton for spreading to the usual delivered cost. Each spreader can apply a load of this material at the rate of 4 tons per acre in from 8 to 10 minutes. Deliveries are often made 20 miles or more from the plant.

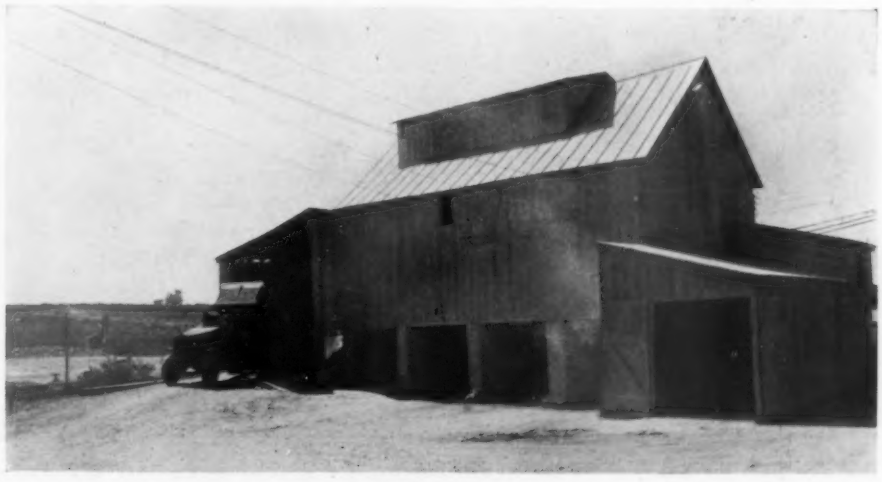
The deposit is high-calcium limestone which is stripped, drilled and blasted in the usual manner. A ¾-cubic yard Thew gasoline shovel loads the stone into trucks for haulage to the plant. A side line has been

Hopper-body truck which feeds stone to elevator.

developed from a pond in the quarry which is well stocked with minnows and chubs that are sold to fishermen in this lake region.

The stone is dumped from the trucks into the Number 5 Austin gyratory primary crusher at the plant. The minus-1½-inch crushed stone is carried by an elevator to the 3- by 12-foot Allis-Chalmers 2-deck Low Head screen. This has 1-inch and ⅝-inch openings on its top and bottom decks, respectively. The material passing over the top deck goes to a Number 5 Allis-Chalmers gyratory

(*Continued on page 68*)



Crushing and storage building. Quarry is at left.

Basic Refractories' Crushers Located in Pit 65 Feet Below Quarry Floor Level

another ON THE SPOT report

ONE of the outstanding stone quarrying, crushing, and processing operations in this country, but one about which little has been published, is that of Basic Refractories, Inc., at Maple Grove, near Tiffin, Ohio. At this location the company quarries, crushes and sizes from 400 to 450 tons per hour of flux stone, refractory stone, aggregates, agstone, etc. Seven rotary kilns producing dead-burned dolomite for the steel industry make this operation probably the largest producer of this material. This article is concerned chiefly with the deposit, the quarrying methods, the unusual primary- and secondary-crushing department, and the screening department, with some mention of the utilization of the various products. A brief history of the expansion of these operations through the years is included.

The deposit is the high-grade Niagara dolomite native to this section. The quarry now covers about 120 acres of the 800 acres owned by the company at this location. At the present quarry level the face varies from 50 to 65 feet in height and the quarry will be expanded indefinitely on this level.

The quarry was opened about 40 years ago by The Holran Stone Company to produce crushed stone on a small scale. In 1908 the Holran Company was purchased by H. P. Eells of Cleveland with the intent of mechanizing and expanding the operations. Major improvements in the quarrying facilities were made

By W. E. TRAUFFER

at once but the company did not enter the manufacturing field until 1919 when a rotary kiln plant was completed to produce dolomite clinker according to a process developed and patented by George W. Patnoe, the Company's general manager. This was one of the first installations of its kind in this country.

Additional manufacturing units were installed in the late twenties in keeping with the expanded use of manufactured dolomite as a basic-hearth refractory. In 1936 the company entered the field of magnesia refractories and shortly thereafter built a kiln plant at these works to accommodate this business. In 1943 it constructed a dolomite manufacturing unit in behalf of the Defense Plant Corporation adjacent to its existing plant and in order to assist in meeting the war demands.

In 1927 the original crushed stone plant was replaced by the steel and concrete structure which now serves as the screening building. This part of the operation was improved and enlarged several times before November, 1941, when the present quarry haulage, crushing and stock-piling system went in operation.

In 1931 the corporation, now Basic Refractories, Incorporated, absorbed the business of The Kennedy Refractories Company, the four rotary kiln plant of which is located at Bettsville, two miles distant from the company's principal Maple Grove, Ohio, works. The 11 kilns in these combined operations make the company undoubtedly the country's largest producer in its field. The Bettsville plant is used for burning only, the raw materials being supplied for the most part from Maple Grove.

In designing the new crusher layout in the quarry every advantage was taken of the topography to eliminate unnecessary handling of the rock. The primary crushers are in a pit below the second or present quarry level, the crushed-material surge pile is on an island left from the old first level of the quarry, and the screening building is on the surface of the deposit.

The primary crusher pit was excavated to a depth of 65 feet below the level of the quarry floor. In the bottom a massive slab of concrete was poured which is anchored to the rock by reinforcing steel. The lining of the pit is a monolithic reinforced-concrete shell which is a 42-foot-diameter cylinder and was poured continuously by the slip-form method. This shell was anchored securely to the rock to withstand the 4,000-pound per square foot pressure of the ground water which would otherwise cause it to float. The ground water level is only a few feet below the quarry level. An interesting sidelight is the use of this water pressure for cooling the crusher bearings.

In the quarry 7-inch blast holes are drilled with Loomis churn drills, two of which are crawler and the third wheel-mounted. Shots are comparatively small, usually six holes in a single row, due to the

This view from the quarry shows the crusher building, the stock-piling conveyor and crushed-rock stock pile, the reclaiming conveyor and the recrushing and screening building.

proximity of buildings to most of the face. These holes average 14 feet of burden and are spaced 23 feet apart. The 40 per cent. dynamite used is detonated electrically.

A Bucyrus-Erie 120B electric shovel, with a 4-cubic yard dipper and Ward-Leonard control, loads the stone into Autocar trucks. These are powered with Cummins Diesel engines and have 15-cubic yard Truck Engineering Company end-dump bodies. Because of the size of these bodies dual hydraulic hoists are used to dump them. There are 5 of these trucks.

As each truck is backed up to dump into the primary crusher it is stopped for a moment on a Fairbanks scale while its weight is automatically registered on a recorder attached to the dial of the scale. As soon as the record is made a bell rings and a green light flashes on to signal the driver to back and dump the load into the hopper ahead of the primary jaw crusher. The empty trucks are weighed once each shift to insure the accuracy of this system.

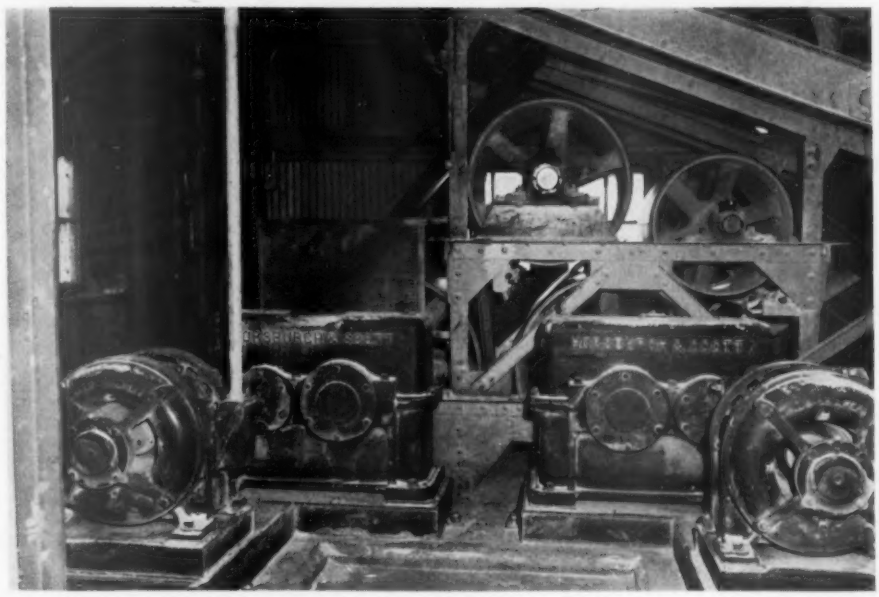
The stone is discharged from the trucks into a steel hopper over the 60- by 84-inch Power and Mining (Allis-Chalmers) "Superior" jaw primary crusher. The sides of this hopper are sloped so as to provide for free passage of the rock and it renders the use of a feeder unnecessary. This crusher is driven through

The direct discharge from the primary jaw crusher into the gyratory crusher.

a Falk speed reducer and 2 Falk "Airflex" couplings by a 250-hp. motor. The minus-9-inch stone from this crusher drops through a chute, which has heavy hanging chains to regulate the feed, into an 18-inch Allis-Chalmers gyratory crusher. The latter is driven by a 200-hp. motor through a Horsburgh & Scott speed reducer.

On rails above the truck hopper is a 20-ton Milwaukee overhead traveling crane. This operates stone

The 4-cubic yard electric shovel loading one of the 15-cubic yard dump trucks. The 7-inch churn drills are also shown.



The tandem speed-reducer drive near the feed end of the stock-piling belt-conveyor. The reclaiming conveyor is similarly driven.

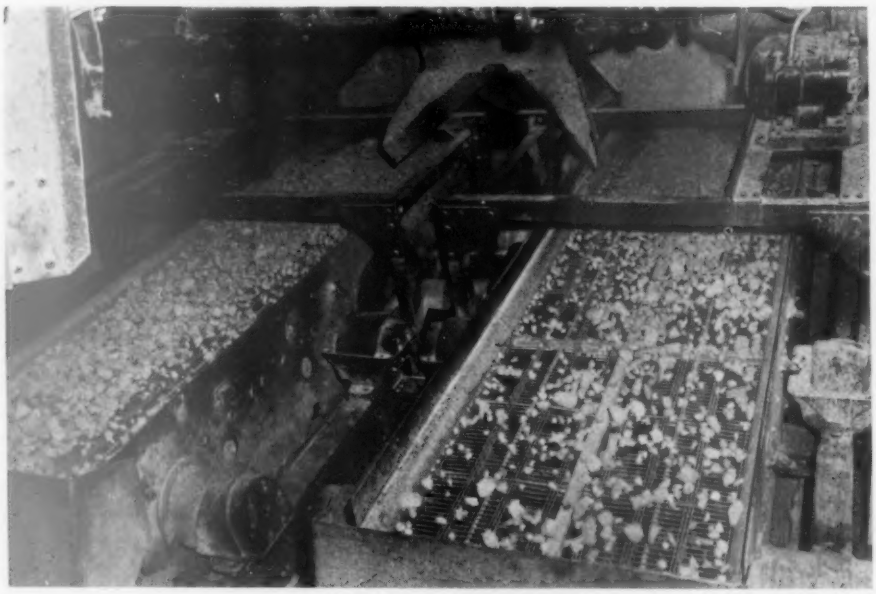
hooks for both crushers and can be used to handle repair and replacement parts.

The minus-5-inch stone from the secondary crusher is discharged to a Stephens-Adamson pivoted bucket carrier with 48-inch-wide buckets on 36-inch pitch. This carrier elevates the stone 60 feet to a point a few feet above the quarry floor level and then discharges it from a horizontal run on the 36-inch by 338-foot main stock-piling belt-conveyor. The crushing department has a capacity of 500 t.p.h. which is in excess of present requirements.

The main conveyor is driven at a point near its feed end by an original type of tandem drive which uses three pulleys in addition to the two driven ones. Each of two drive pulleys is connected through a Horsburgh & Scott speed reducer to one of 2 Allis-Chalmers 40-hp. high-slip motors which operate in synchronism. The discharge end of this conveyor is supported on a steel cantilever framework with an 84-foot overhang which keeps its supports clear of the live section of the stock pile where it would be subjected to varied and shifting stresses. The stock pile has a total capacity of 24,000 tons of which about one-third is live storage. In case of necessity the balance can be reclaimed by bulldozer.

Under the stock pile is a 36-inch

One of the trucks dumping its load into the primary crusher after being weighed on automatic recording scale in foreground.



Two of the four 4- by 14-foot double-deck screens which make the second and third stone separations.

The two pairs of live-roll grizzlies which scalp the oversize stone to the reduction crushers.

by 5-foot pan feeder which discharges the stone on the 30-inch by 389-foot belt conveyor to the screening building. The feeder is driven through a Reeves Moto-Drive, the speed of which is controlled from the screening plant. Attached to the feeder is a tachometer, indicating on a volt-meter in the screening plant the rate of feed in tons per hour. This rate can be changed instantaneously to secure any rate of feed desired for most efficient operation. The conveyor is driven through a tandem gear-reducer drive identical with that on the quarry conveyor. Both conveyors have G.E. torque brakes, to prevent backing up under load in case of power failure, and inclined counter-weighted takeups. A Merrick Weightometer on the reclaiming conveyor keeps a record of the amount of rock withdrawn from

One of the two 4-foot cone crushers which reduce oversize from live-roll grizzlies.

Device which weighs stone passing over belt-conveyor to stock pile.

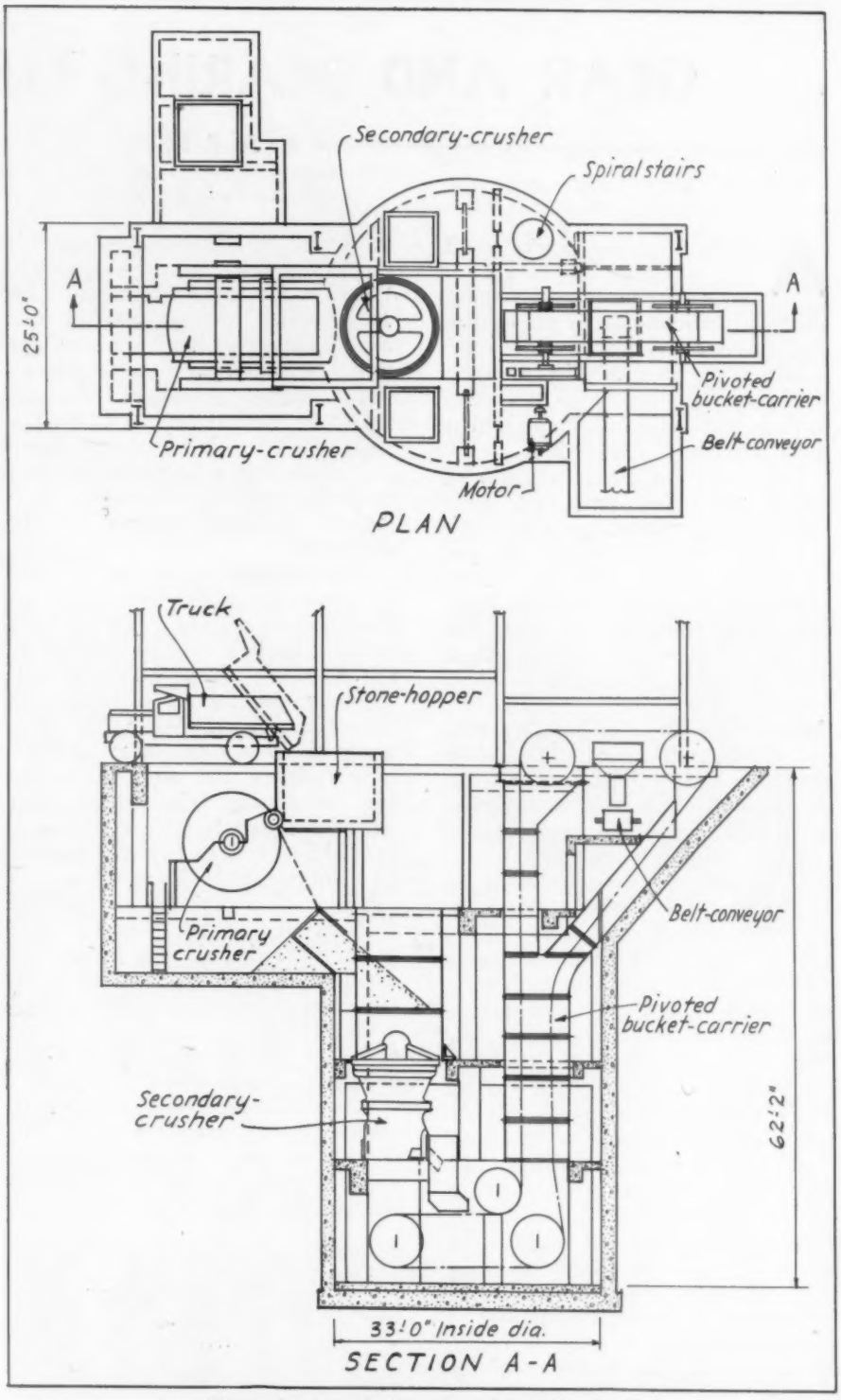
the stock pile.

The screening department is designed to make 8 different sizes of crushed stone for various grades of blast furnace flux, refractories, aggregates, agstone, etc. Ordinarily the screening capacity is 400 tons per hour but when large sizes are in demand 450 tons can be produced.

The pivoted-bucket carrier which feeds from reduction crushers back to grizzlies.

Speed-reducer drive of the pivoted bucket carrier from primary crushers to stock-piling conveyor.

In this building two pairs of Stephens-Adamson live-roll grizzlies do the scalping. The oversize stone is reduced by two 4-foot Symons cone crushers, one the standard and the other the short-head type. These crushers discharge their products on a pivoted bucket carrier to form a closed circuit with the grizzlies. The rock passing through the grizzlies goes to four 4- by 14-foot Tyler Ty-Rock 2-deck screens for preliminary separation, followed by four 3- by 6-foot Tyler Niagara 2-deck screens for coarse sizing and four 4- by 10-foot Nordberg Symons 2-deck screens for fine sizing. Four 4- by 10-foot Allis-Chalmers Low Head 1-deck screens are used for the separation of agstone and other extremely fine products. The fine-sizing screens are equipped with washing sprays and a Dorr sand wheel dewaters the 5- to 14-mesh material before it is discharged into the storage bins. The minus-14-mesh material for the agstone plant is flumed with the water to a dewatering plant where it is stock-piled by belts and reclaimed by cranes for sale as agricultural limestone. The materials for refractory manufacture are taken from bins under the screens by conveyors to the manufacturing plants.



Plan and sectional views of crusher pit in quarry.

There are 20 concrete bins of 200 tons capacity each, arranged in two rows over car-loading tracks. A Fairbanks track scale with a 110-foot platform under one row of bins is used for weighing out shipments. A Plymouth 30-ton gasoline locomotive and a 45-ton G. E. Diesel-electric locomotive do the switching.

These plant improvements were designed by W. W. Patnoe, chief

(*Continued on page 72*)

GEAR AND BEARING LUBRICATION

By A. F. BREWER
Technical and Research Division
The Texas Company

ASIDE from the power plant, the proper lubrication of mining machinery requires primary consideration of the gearing and heavy-duty bearings; in other words, parts, which if worn to excess, may cause the machines to operate inefficiently or require replacement of "hard-to-get" materials.

Lubrication of power-transmission drives and speed-reduction gears may always present a potential problem due to load conditions and frequently exposure. On any exposed gear there is a possibility of the lubricant being contaminated with dust or dirt to increase the amount of wear and alter the pitch line.

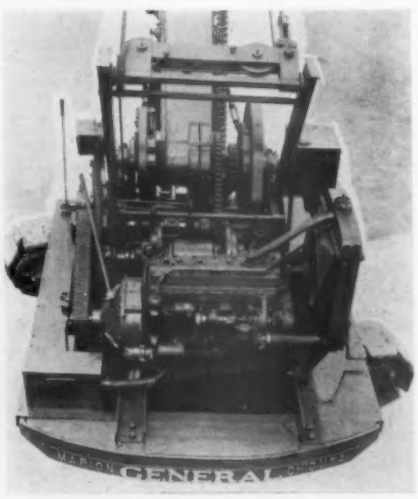
Gears Pressure also requires consideration in many such gear installations. As a general rule the tooth pressures will be comparatively high, due to the small areas of contact. The more accurately the gears have been cut the more intense will be the unit pressure, inasmuch as line contact will more nearly prevail. Gear-tooth pressures change constantly as the opposing teeth mesh with each other. This causes a change in the direction of the application of the load. As long as rolling motion predominates, the effect on the structure of the teeth will not be serious. When wear occurs, however, there will be a tendency for the motion between the teeth to become sliding instead of rolling. Then a certain amount of grinding occurs between the teeth to cause wear, especially if lubrication is not maintained in an effective manner.

To offset this a gear lubricant should possess a high degree of lubricating ability. It was realization of this fact that prompted such intensive study of gear lubricants during the past decade and resulted in the development of both straight mineral and E.P. products of vastly improved film strength commensurate with the viscosity of fluidity. This enabled gear engineers in turn to adopt more precise methods of cutting and to some extent to produce gears of higher load-carrying capacity for the same tooth area.

Temperature, of course, affects the fluidity, although in normal operation gears will function at atmospheric temperature. As a result, there will be but little possibility of the gear lubricant being reduced in viscosity by abnormal heat. The effect which low temperature may have upon a gear lubricant in service, however, requires more consideration. Certain grades of lubricants will have a tendency to congeal to such an extent as to become brittle and crack. If a lubricant has been properly refined, however, there should be little danger of this occurring.

The average range in viscosity for service on exposed gears will vary from approximately 1,000 to 2,000 seconds Saybolt at 210 degrees F., the lubricant being chosen to meet the operating temperatures and the size of the gears. Where the gears are inclosed a more fluid lubricant is advisable. The same holds true for the average silent-chain drive where comparatively low clearances prevail between the link mechanisms. The lubricant, of course, must be capable of penetrating to all the surfaces of contact between these parts; otherwise, abnormal wear may develop. Here a lubricant of about the same viscosity as a heavy steam-cylinder oil, *i.e.*, in the neighborhood of 150 to 200 seconds Saybolt at 210 degrees F., has proved satisfactory.

Along with the type and extent of refinement of the lubricants employed, the means whereby they are applied or distributed has a marked effect upon their ability to insure efficient and economical gear operation. Obviously, even the best lubricants may function ineffectively if they are unable to cover the contact surfaces of the teeth.



The machinery deck of a power shovel. All high-speed parts operate in anti-friction bearings. The first reduction is through an adjustable silent chain. (Photograph courtesy General Excavator Company)

Probably more failures and complaints arise from ineffectual lubrication through misusage of lubricants than from any average operating condition. In many cases these can be traced to ignorance, in others to lack of appreciation of the lubricating requirements. With an understanding of the latter, and knowledge of the lubricants which are available, the protection of gears should be materially simplified. Each operator, however, must study his own particular operating conditions, then use his lubricants intelligently, in accordance with the recommendations of the builders of his machinery and the oil company from whom he purchases. Makeshift or obsolete ideas may have been permissible in the past; to-day the necessity for maximum production demands the adoption of the most modern means of lubrication in the interests of continued and efficient operation.

Wear in gears and driving chains is indicated by excessive noise. As a general rule there will be better ventilation than prevails with the average bearing. In consequence increases in operating temperatures usually will not be as marked even in extreme cases of faulty lubrication of gear teeth or chain-link connections, for radiation will serve as an effective means of temperature reduction.

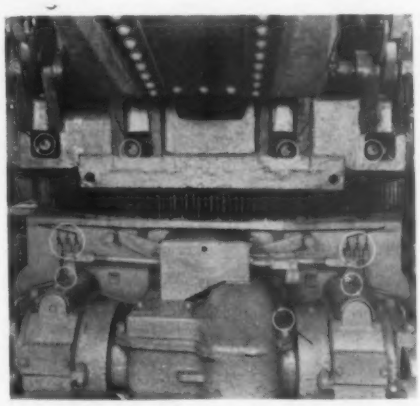
The development of continued, noisy, clanking operation is a decidedly positive indication that a gear or chain lubricant is not functioning effectually as a preventive of metallic contact and solid friction.

Fortunately there are regular periods over which a gear lubricant is inactive, for actual contact between the teeth occurs only when they are in mesh. To a somewhat less extent the load imposed upon a chain-link connection will also be decreased during the period of slack operation.

Chain lubrication, however, more nearly approaches bearing lubrication in the requirements which will be imposed upon the lubricants. Yet there is more chance for lubricant

Chain and gear mechanisms on a power shovel. Lubrication of the heavy-duty roller chain is of considerable importance due to the low clearances which prevail. (Photograph courtesy Harnischfeger Corporation)

to be thrown off from a chain link than from the average bearing, for even though bearings themselves may be subject to rotary or reciprocating motion, this will not be as severe as the action of centrifugal force on a driving chain. This effect may be most serious in the lubrication of high-speed exposed or semi-



A view directly under the shovel boom on a crawler-mounted gasoline shovel. Circles and arrows indicate pressure gun fittings. The lower frame gears are inclosed in substantial housings and run in oil. (Photograph courtesy Link-Belt Company)

inclosed chains; it will be greatest during the period of bending, as the chains pass over the sprockets. At such times any lubricant on the outside surface of a chain may be thrown off, although this will depend upon the adhesive ability of the lubricant and the peripheral or surface speed of the sprockets.

All this calls for:

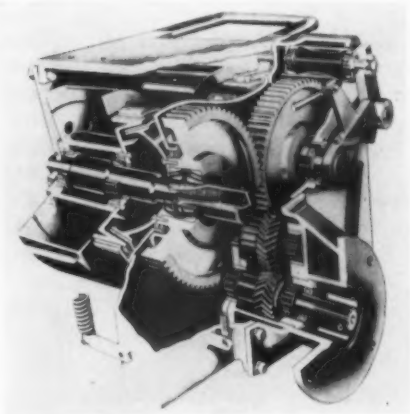
1. The selection of a lubricant of adequate viscosity and adhesive ability, commensurate with the manner of housing and the method of application, and

2. Application of this lubricant over the inner or more active wearing surfaces, in order to insure as complete penetration as possible to the teeth or link connections before the lubricant has a chance to work its way to the outside surfaces from which it may be thrown off.

These considerations apply more strictly to the exposed or semi-inclosed drive, wherein there is but little or no provision for automatic lubrication. Where a driving chain or gear set receives a constant supply of lubricant as in the timing-gear drive in an automotive engine, or those inclosed industrial chains which are fitted with means for circulation of oil from a base reservoir, the maintenance of lubrication is more positive and requires only an adequate supply of properly refined gear lubricant.

Bearings Alignment is most important in heavy-duty bearing operation. Theoretically line contact prevails in a heavy-duty roller bearing. Actually, however, the potential contact surface for such a bearing is rectangular, though of considerably less area than in a sleeve bearing. This contact, especially in a roller bearing, must be maintained without deviation, for skewing of a roller on a turntable or track-roll assembly, for example, may throw the entire bearing out of line, to result in uneven load distribution and wear. In other words, just as in a well-designed sleeve bearing, the axes of the bearing elements must be in the same plane as the axis of the rotating shaft.

Proper guiding has been found to be the most effective way to keep the rollers from skewing; this is a function of the guide flange. As the rollers are increased in the ratio of length of diameter, guiding may become more difficult. At the same time, while one objective may be attained, the problem is aggravated by the sliding motion which is developed between the ends of the rollers and the end plates or race flanges. Continuous renewal of the lubricating film is necessary to pre-



Cutaway view of a scraper power control unit. This unit mounts on the rear of the tractor and transmits engine power to the cable to operate the earth moving or construction equipment. (Photograph courtesy R. G. LeTourneau, Inc.)

Lubricating the track rollers on a shovel. The necessary fittings are protected to keep out dirt and prevent damage. (Photograph courtesy Marion Steam Shovel Company)

vent actual steel-to-steel contact at this point.

The lubricant serves a number of purposes in a heavy-duty bearing.

(1) It must protect the component parts of the bearing against corrosion.

(2) It must assist the seal in preventing the entry of water or dirt, and the resultant abrasive or corrosive effect on the bearing surfaces.

(3) It must be a good heat-exchange medium to aid in bearing cooling.

(4) It must function as a lubricant to enable free oiling of the rollers in a roller bearing, and sliding between the rubbing surfaces of the shoulders and rollers.

A lubricant which trains freely with the moving parts at the prevailing operating temperatures will meet these requirements most effectually. At the same time the lubricant must channel sufficiently so that actual churning does not occur. Excessive churning will increase the power consumption through internal resistance within the lubricant itself. This frictional effect leads to heat development which may easily build up the bearing temperature beyond the cooling ability of the lubricant, then trouble may be impending.

The seal is an important adjunct

Cutaway view of final drive for a super C Tournapull. (Photograph courtesy R. G. LeTourneau, Inc.)

to cleanliness. If abrasive foreign matter is kept out of the bearing, the wear will be reduced, especially if clean, dirt-free lubricants are used and protected from contamination.

On the other hand, if abrasive particles are present, rough rolling of the bearing will result. When this occurs in a freshly lubricated element, it signifies abrasion. At first this may be very slight, and may not be noticeable. But abrasion and wear are going on just the same, until, dependent upon the amount of dirt, the speed and the size of the bearing, loose rolling or chattering will develop. At the same time the heat at the contact points may be so high as to assist in oxidation-breakdown of the lubricant. Then gums and lacquers may form. Thorough cleaning, drying and relubrication of the bearing parts before wear has occurred to excess is the best preventive against further difficulty.

Lubricating oils or greases for heavy-duty bearing service accordingly must possess very definite characteristics. These features must be considered according to the nature of the service, likewise the means provided for relubrication.

Greases suitable for heavy-duty bearings are studied in accordance with the actual lubricating requirements, also with respect to the ability of the lubricating systems to handle the finished grease under the prevailing operating temperatures. In other words, certain definite pressures are available for grease distribution through the lubricating system, according to the design of the pressure pumps.

Accordingly the petroleum refiner begins with careful selection of the fatty oil and alkali which are used to make the soap base; then he selects a range of straight mineral-oil viscosities which are best adapted to the prevailing temperature conditions. All these basic materials must be of a high degree of purity and free from contaminating foreign matter. They must then be combined so that the finished grease will be uniform in composition and texture, resistant to chemical breakdown, not too water-soluble, and structurally capable of being pumped at low temperatures.

Water and heat must always be studied when planning the manufacturing procedure for a grease, since the effect of water upon certain soap stocks, and the viscosity-reducing effect of heat on the viscosity of mineral oils may affect materially the lubricating ability. Lime soap is insoluble in water, so it is widely used where an excess of water may be present. Where soda soap or mixed (lime-soda) base greases are involved, the solubility tendency will increase with the temperature of the water.

Pressure grease lubrication by positive delivery of measured quantities of grease at periodic intervals is customary on mobile machinery. The equipment has been specifically designed to prevent the entry of non-lubricating foreign matter to assure economy of lubricants and to reduce the hazards in handling, filling and control.

Nellis *(from page 61)*

crusher for reduction to 1-inch size and under and is returned to the screen by the same elevator.

The 1-inch to ⅝-inch rock drops from the screen into a bin.

The minus-⅝-inch material falling through the bottom deck drops on a small vibrating screen which is equipped with ¼-inch wire cloth. Both its products drop into bins.

All the ¼-inch material is sold for black-top highway work and some of the ⅝-inch material is similarly used.

Practically all the 1-inch is now made into agricultural limestone and some of the ⅝-inch material is also used for this purpose. These materials are discharged from their bins into a truck provided with a special 1½-cubic yard hopper body of original design. This has a small slide-gate-controlled discharge opening close to the ground through which this material is discharged to the hopper of a bucket-elevator in the pulverizing department. This elevator discharges the materials on a belt-conveyer which feeds it into the 16-inch Gilson hammer-mill pulverizer. The finished product is elevated into truck-loading bins.

The various sizes of rock produced are stock-piled, as is some of the agricultural limestone during slack periods. A ⅜-cubic yard Byers Bearcat shovel is used to load trucks from these piles.

W. W. Wallace Promoted

The Portland Cement Association announces the appointment of W. Wayne Wallace as district engineer in charge of its Chicago District Office. He will have charge of association activities in the state of Illinois with headquarters at 33 West Grand Avenue, Chicago.

For the past fifteen years Mr. Wallace has been a P.C.A. office and field engineer in Chicago. He joined the association staff in 1924 and has been continuously employed with the exception of a three-year period when he was engaged in engineering sales work.

He is a graduate of the University of Illinois, past president of the Illinois Society of Engineers, and a member of the Western Society of Engineers and the Chicago Engineers Club.

Farm Stone Advances from By-Product to Main Product at Tennessee Plant

Plant structures and roadway leading up from the quarry.

another ON THE SPOT report

STARTING with total sales in 1938 of 4,000 tons of by-product agricultural limestone, C. A. Langford, pioneer crusher-stone producer of Gallatin, Tennessee, has witnessed the remarkable, year-by-year progress of agstone production from comparative insignificance to its present front-rank importance. Mr. Langford holds an A.A.A. contract for 100,000 tons of agricultural limestone for Sumner County, Tennessee, in addition to 50,000 tons which he will produce in 1944 for direct sale to farmers, and not less than 90 per cent. of this total will be spread by company trucks. It is expected that the plant will also produce not less than 100,000 tons of crushed stone for road work this year, to make a total 1944 production of 250,000 tons.

Although Mr. Langford has been in the crushed-stone business for more than 25 years, the present quarry and plant started operations only 10 years ago with a capacity of 60 tons per day. The alert management has made additions or improvements of some description in each year since the plant was first operated, and despite war shortages and priority difficulties new equipment will be installed during the current year.

The stone is being supplied to the plant from a 122-acre deposit of 95.75 per cent. $CaCO_3$, which is being worked from a 34-foot face. Only two acres of the deposit has been worked out in 10 years. The bottom 12 feet of the stone has been found best for road work, while agricultural limestone is produced mainly from the upper layer. The 3-foot overburden is stripped by a

By WILLIAM M. AVERY

Bucyrus-Erie angledozer mounted on an International UD18 tractor; a 9-cubic-yard LeTourneau Carryall is also used for this purpose.

Two Sullivan wagon drills are used for drilling blast holes, and a 210-c. f. m. Sullivan portable compressor supplies air for this operation. One man operating both wagon drills can drill about 600 feet daily of 18- to 24-foot holes with 6-foot changes of steel. Excellent footage is obtained with Sullivan detachable drill bits which are re-sharpened once.

The best breakage is obtained when up to 100 holes in 5 to 6 rows are shot simultaneously. In wet weather the bottom is loaded with Austin 60 per cent. extra-gelatin 1½- by 8-inch sticks, while the upper portion of the charge consists of

Open view of the hammer-mill which makes agstone.

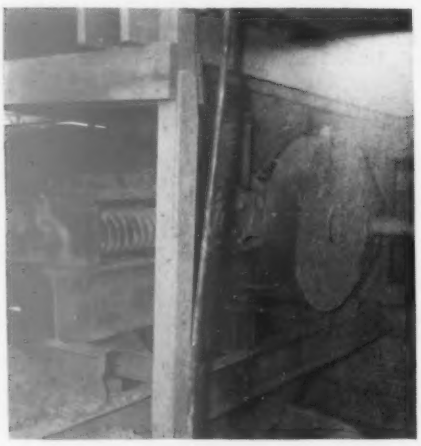
Austin 40 per cent. extra-gelatin 1¼- by 8-inch sticks. In dry weather LDX 1¼- by 8-inch sticks are used. The explosives are all battery-detonated. Although there is little occasion for secondary blasting, a Sullivan L52 jackhammer and a

Quarry shovel loading a truck.

Two wagon drills operating on air supplied by the 210-c.f.m. compressor.

Sullivan 105-c. f. m. portable compressor are available for this purpose.

An Osgood ½-cubic yard shovel loads stone from the quarry floor to two trucks which make the 500-foot haul to a hopper over the present 20- by 36-inch Pioneer primary jaw crusher. A 24- by 36-inch Pioneer jaw crusher and a grizzly feeder are soon to be installed at this location,



The secondary crushing rolls.

replacing the smaller crusher now in use.

From the primary crusher the stone is conveyed by a 30-inch by 90-foot Pioneer belt-conveyor to the 400-ton surge bin. From here it is fed by a 24-inch by 90-foot Pioneer belt-conveyor to the 3- by 10-foot triple-deck Pioneer vibrating screen. The agstone and two grades of road rock are stored in three 60-ton bins located under the screen.

The road rock is rescreened over a 3- by 4-foot Pioneer double-deck vibrating screen to remove all the dust. The minus-¾-inch material is fed from its bin compartment to a 3XB Gruendler center-feed hammer-mill, which has a reversible motor so that both sides of the hammers may be used without shutting down the machine. From the hammer-mill a 24-inch by 70-foot Pioneer belt-conveyor carries the fine rock back to the belt-conveyor ahead of the large screen, and it is returned in closed circuit to the storage bin. Secondary grinding of 2½-inch to ¾-inch rock is accomplished in the same manner, using a Pioneer roll crusher located under the bins.

Since the capacity of the quarry is considerably greater than the capacity of the plant when producing agstone, the surge bin has helped to correct this unbalance by making it possible for one man to grind on a second shift while the remainder of the plant is shut down. Stockpiling is done only when weather conditions prevent hauling. A Fairbanks truck scale is used for weighing.

The primary jaw-crusher.

The company owns and operates 17 International trucks, of which 8 are of the end-dump type and 9 are Baughman spreaders of 5- to 7-ton capacity. Last year 8 trucks were added to the fleet to assist in delivering agricultural limestone, and in addition 6 or 7 trucks are normally hired during the rush season. Due to the plant's location on the edge of the county in which most of its agricultural limestone is sold, it is necessary to deliver and spread at distances up to 25 miles. The current price of this material is $1.40 per ton at the plant, $2.25 per ton delivered and $2.85 per ton spread. There is no railway haulage at present.

Loaded spreader truck being weighed.

With the exception of a few bad days, the plant ran without interruption through the winter, but due to the shortage of help it was possible to maintain only one-shift operation. The present crew of men work an average of 10 to 12 hours per day.

In commenting on the high tonnage of limestone spread by company trucks—about 90 per cent. of sales at the present time—Mr. Langford admits ruefully that spreading was for the most part thrust upon him by the shortage of farm help. It is his belief, however, that this practice must become general if the demand for agricultural limestone is to be maintained at its present high level, since the vast majority of farmers refuse to do their own spreading even when labor is plentiful.

In Mr. Langford's opinion the withdrawal of A.A.A. subsidies would bring about a reduction of not more than 50 per cent. in the demand for agstone. He believes that at least half of the farmers now using it are thoroughly convinced of its merits and would continue even if there were no subsidy of any sort.

Washington Haydite Co. Uses Local Material for Light-Weight Aggregate

another ON THE SPOT report

By W. E. TRAUFFER

OVER a period of many years the writer has kept PIT AND QUARRY readers informed of the slow but steady invasion of the Pacific Northwest by concrete building units. In this lumber stronghold ready-mixed concrete found fairly ready acceptance and has for some years been an important industry. Concrete building units are now approaching the same status after a long uphill fight. Both industries are now benefiting from the production in this area of a well-known light-weight aggregate which gives their products added advantages.

This product is Haydite and is being produced by the Washington Haydite & Concrete Products Company near Bothell, Washington, 16 miles northeast of Seattle. This company controls a 40-acre deposit which is said to contain about 3,000,000 cubic yards of clay suitable for Haydite manufacture. The plant went into full operation late in 1942 with a capacity of about 180 cubic yards in 24 hours. Incorporated in it is some equipment left over from a previous unsuccessful attempt to work this deposit.

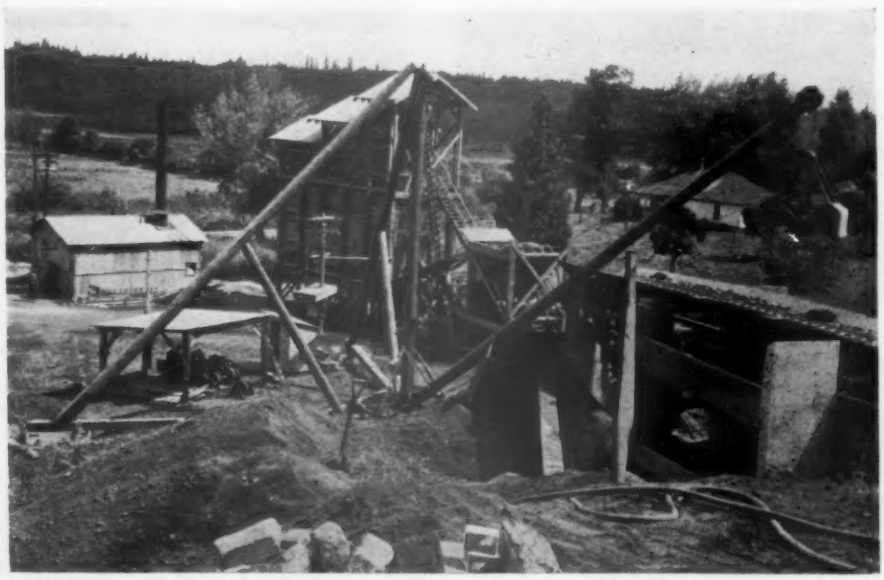
A typical analysis of the clay follows:

SiO_2	58.00 per cent.
Fe_2O_3	11.00 per cent.
Al_2O_3	28.00 per cent.
Ca O	0.70 per cent.
Alkalies	1.55 per cent.

There are also traces of MgO, sulphur and other ingredients and the loss on ignition is negligible. About 1¼ cubic yards of finished Haydite is obtained from each cubic yard of clay mined.

The Haydite is being made in ¾-, 1½-, and $\frac{3}{16}$-inch sizes and fines. A Bx mix for concrete blocks contains about 55 per cent. of fines and $\frac{3}{16}$-inch material and 45 per cent. of ½-inch. These products weigh about 60 pounds per cubic foot. Plans are under way to make an extra light product for refractory boiler work. So far most of the output has been used in government construction work, some having been shipped as far as Alaska.

The preliminary processing department and drier which discharges to pile at right.



The chain conveyor from drier, the clamshell derrick and the screening building.

The deposit is located on the side of a hill and trees must be removed as the pit is expanded. The shale-like blue clay is excavated with a Sauerman 1-cubic yard Crescent scraper which is operated by a Bagley hoist. This drags it up a wooden incline into a 500-ton wooden bin from which a Chain Belt drag-chain conveyor feeds it into a 9-foot Eagle Iron Works dry pan. An 18-inch by 65-foot belt-conveyor carries the material discharged from the pan to a surge hopper.

Another drag-chain conveyor feeds the clay from this hopper into the 90-inch by 55-foot rotary kiln which was converted from a Ruggles-Coles indirect-heat rotary drier. The inner shell was taken out of the

drier and the outer shell was lined with firebrick in the hot zone and 6-inch poured Haydite in the rest of the kiln. The kiln is oil-fired with steam injection and burns 17 gallons of fuel oil in producing 1 cubic yard of finished product. The kiln removes the 25 per cent. moisture in the clay. The oil is stored in a 10,000-gallon tank and a 100-pound boiler supplies steam for heating and injecting the oil.

The hot product of the kiln is carried by another drag-chain conveyor to a stock pile below the kiln where it is allowed to cool. A timber stiff-leg derrick with a ¾-cubic yard clamshell bucket operated from

The single-deck sizing screens over the bins.

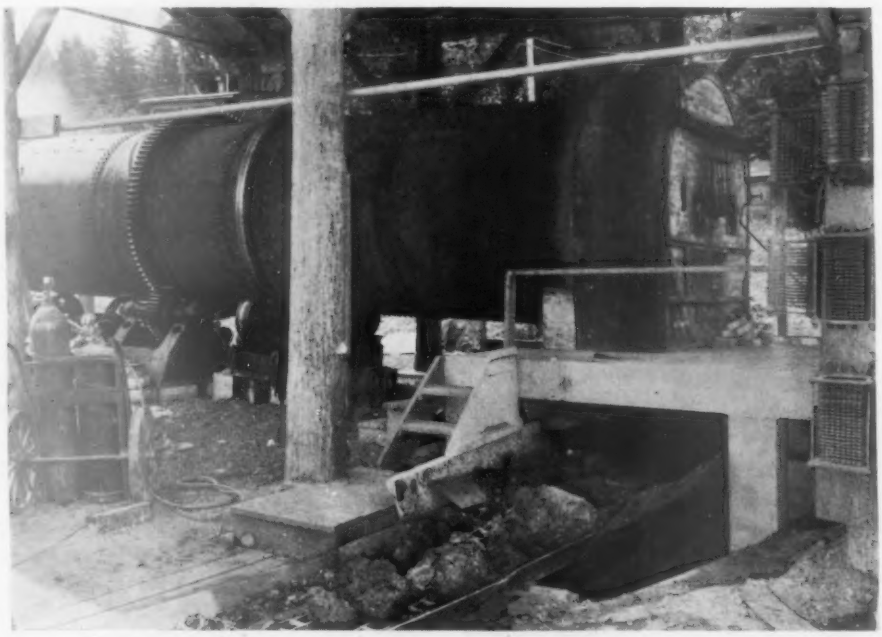
a 60-foot boom by an American 4-drum hoist and a 40-horsepower motor transfers this material to a second pile where it is spray-cooled. It is then fed by the derrick into a hopper over another 9-foot Eagle dry pan. A Chain Belt chain-elevator feeds the product of this crusher to a series of three Colorado Iron Works 1-deck shaker screens, from which the four sizes of Haydite drop into separate saddle bins with a combined capacity of 270 cubic

Looking down on the second dry pan.

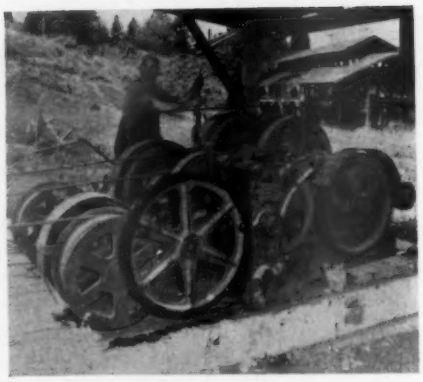
yards. Both trucks and cars are loaded from these bins.

A Caterpillar tractor equipped with a La Plant-Choate bulldozer is used to clean up the stock piles, yard, etc.

Bert E. Harrison, president of the Washington Haydite & Concrete Products Company, and E. L. Warner, vice-president, are also interested in the Harrison Concrete Pipe Company, Tacoma, and other related operations. J. F. Wettrick is secretary of the company. J. L. Warner, plant superintendent, was



The 7½- by 55-foot rotary drier with drag-chain conveyor below.



The four-drum hoist which operates the clam-shell derrick.

previously associated in a promotional capacity with the Concrete Pipe & Products Association, Seattle. The company's office is at 805 Arctic Building, Seattle.

Basic (*from page* 65)
engineer of Basic Refractories, Inc. Those responsible for operations include: C. G. Adams, manager of operations; A. M. Weaning, general superintendent; N. E. Hansen, assistant general superintendent; G. E.

The sand wheel which dewaters the 5- to 14-mesh material before it goes into bins.

Stone, plant engineer and superintendent of maintenance; J. A. Roslund, burning plants superintendent; R. H. Hearing, special products plant superintendent; Ralph Lee, master mechanic.

Col. Hunt Passes Away

Long prominent in cement and concrete engineering, Colonel Leigh A. Hunt, 70, died May 7 at San Antonio, Texas.

Colonel Hunt designed and built the plant of the Wolverine Portland Cement Company at Coldwater, Michigan in 1898. Later he engineered other plants in the United States, Canada, Mexico and Alaska.

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Research in Lime Reviewed as NLA Group Meets in Virginia

IN lieu of its annual convention, the National Lime Association, following its action of 1943, held an open board meeting at the Homestead, Hot Springs, Virginia, May 16 to 18. Eighteen men, representing 15 lime-manufacturing companies, were present.

At the opening session on Tuesday President S. Walter Stauffer presented his report in which he pointed to the growing concern on the part of the Congress, the government, business groups and individuals in the problems of the post-war period. He discussed the allocation of association funds to different types of markets, such as that for structural lime. In 1907, he said, structural lime accounted for about 60 per cent. of the industry's total output, while in the last pre-war year, 1941, it was but 20 per cent. In the peak building year of 1926 2,320,323 tons of lime was used in construction, but competitive materials, such as cement in mortar and gypsum in base-coat plaster, subsequently made great inroads in the lime market in the construction field. These fields now present the greatest opportunities for increased tonnage. He quoted the Producers' Council, Inc. as authority for the statement that the total volume of private construction will amount to $12,690,000 for the first full year following the end of the war and that the average for the succeeding five years will be $21,638,000, compared with $10,109,000 in 1940 and $14,566,000 in 1941.

Mr. Stauffer mentioned briefly the work being done on mortars and concrete at the Massachusetts Institute of Technology, the X-ray and electron-microscope studies of lime at the University of Illinois, and the development of a new minimum standard for hydrated lime for masonry purposes through the association's fellowship work at the National Bureau of Standards. This standard is being considered by the Federal Specification Committee for possible adoption as a federal standard and will be submitted to Committee C-7 at the June meeting of the American Society for Testing Materials for adoption as an A. S. T. M. standard. He said that certain government agencies are already considering a change in their mortar specifications from 1 (cement), 1 (lime), 6 (sand) to 1 (cement), 2 (lime), 9 (sand), based on these new requirements for hydrated lime.

He spoke, too, of the issuance by the American Standards Association of a new *American Standard Building Code Requirements for Masonry,* prepared by Committee A-41 of the A. S. A. and a part of a general building-code standardization program. This code permits the use of straight-lime mortars, as well as the familiar 1:1:6 and 1:2:9 types, subject to the allowable stress requirements. The use of this code is being promoted by the National Lime Association, the Structural Clay Products Institute, the Portland Cement Association, and the National Concrete Masonry Association acting jointly.

In the field of chemical lime, according to Mr. Stauffer, an increasing amount of attention has been given to the problems of production and use and an effort has been made to start a research program at Mellon Institute. The problem has been to secure enough chemical lime to meet war-time requirements. In 1943 the sales of chemical lime increased to 4,075,000 tons, 8 per cent. above the 1942 level, and 52 per cent. greater than the average annual output in the 1935-to-1939 period.

The speaker referred to the wide use of the association's chemical booklets, *Water Treatment and Supply* and *Principles of Sewage Treatment,* for which more than 2,100 requests for more than 3,700 copies had been received in nine months.

In 1943 the consumption of agricultural lime increased 22 per cent., while that of all types of lime rose only 8 per cent., due, according to Mr. Stauffer, to the better financial position of the farmer and to the growing demand for food crops. Although the Agricultural Adjustment Agency places emphasis on low-quality limestone, according to the speaker, the 22-per cent. increase in the use of burned-lime products compares favorably with the 24-per cent. increase in cash income from farm marketings.

In speaking of the value of association work to the lime industry, Mr. Stauffer said that when the association's research was begun at the Massachusetts Institute of Technology fifteen years ago, practically all specifications called for 1 part cement, not more than .15 part lime and 3 parts sand. This research resulted in the adoption of specifications calling for 1 part cement, 1 part lime and 6 parts sand and meant 232,282 tons of additional lime production per year. The expected change to 1 part cement, 2 parts lime and 9 parts sand—already made by the federal department having to do with building—will mean 154,855 more tons per year. In the field of water treatment the output of lime has risen from 174,694 tons in 1934, when the booklet, *Water Supply and Treatment,* was published, to 335,877 tons in 1942. On an assumed average price basis of $7 per ton, the cost of association work in developing this total added tonnage has been only 1½ per cent. of the sales revenue.

A report on the status of association membership as of May, 1944, revealed that the organization has 39 company members which operate 44 plants that in 1943 produced 1,543,340 tons of lime.

T. R. Boyd of the Office of Price Administration, Washington, reviewed the OPA regulations affecting the lime industry.

A report of the research work done during the year 1943-1944 by the Massachusetts Institute of Technology for the lime association was presented by Professor Howard R. Staley of that school. It dealt with autoclave tests, the strength of brick assemblages, the cube strengths of mortars of various proportions, water retention, plaster research, and the sedimentation of hydrates. The report was illustrated with numerous diagrams and photographs.

With reference to the autoclave tests Professor Staley said that they show that there is not sufficient knowledge of the reactions that take place in the autoclave to determine whether the test is suitable for limes or to fix a procedure or a limiting value for the expansion of limes. As it is impossible to make an autoclave test on straight limes it has not been possible to eliminate the possible variation that might be produced by the cement.

Tests of the compressive strengths of brick-and-mortar assemblages using sand-lime brick revealed that the highest compressive strength of an assemblage made with a 1:¼:3 mortar is only twice that of the lower strength of an assemblage made with a 0:1:2.5 straight-lime mortar. The cube strength of the first mortar is 34 times as great as that of the latter. Professor Staley said that the

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cube test does not give a true indication of the mortar's value when incorporated in masonry.

On the subject of strength-proportion relations the speaker said that the tests made show that the limes of lower sand-carrying capacity give somewhat higher strengths than those of high sand-carrying capacity even when sanded to the same proportion.

In the plaster research so far undertaken it has been found that 60 per cent. regular Portland cement to 40 per cent. lime is required to give a tensile strength of 30 p.s.i. at 16 hours, which is the strength assumed to be necessary to have adequate strength in the scratch coat for normal plastering. The use of adhesive lime in place of ordinary hydrate, according to Professor Staley, reduced the amount of Portland cement required to a 55:45 cement-lime ratio. The use of high-early-strength instead of standard Portland reduced the percentage of cement required to 50:50 by weight for the normal hydrates. When the mix consisted of 27½ per cent. adhesive lime, 27½ per cent. regular hydrate and 45 per cent. standard Portland cement a strength of 30 p.s.i. was attained in 16 hours. Using molding plaster or unfibered gypsum in the proportion 50:50 gypsum: lime by weight gave strengths that approximated 30 p.s.i. The substitution of limestone for lime increases the strength of the mixture but reduces the workability and apparently the cement content can be reduced below 50 per cent. One of the objections to cement-lime mixes for plaster, he said, is the fact that they will not bond to plaster board. Absorption tests reveal that the only mixes having absorption comparable to that of gypsum specimens are the cement-lime-limestone mixtures, which for certain uses would make satisfactory plastering materials. They undoubtedly would prove suitable for stucco or outside use where the question of bonding with plaster board would not be encountered.

Dr. George L. Clark and John P. Tordella were scheduled to present a report on the research conducted by them at the University of Illinois under the National Lime Association Graduate Research Assistantship, but they were unable to be present. The investigations conducted since the beginning of October of 1943 had to do with the classification of magnesium oxides, particle size specification for limes, lime hydration, limes as chromatographic absorbents, and the evaluation of surface activity. X-ray diffraction patterns for numerous samples of magnesium oxide prepared in various ways were among the experimental data developed; as well as density measurements, adsorption properties to methylene blue and iodine and other colored substances: the catalytic properties in the decomposition of hydrogen peroxide; and electron micrographs.

It was found by these investigators that a flake-like type of MgO possessed the greatest activity in absorbing satisfactorily and in catalytically decomposing hydrogen peroxide, the needle form ranked second and dense rods third. The purpose of the study was the development of a method of specification and evaluation of pure magnesium oxides as derived from original magnesium ores, from dolomites, or from the oxidation of pure metallic magnesium and the behavior of magnesium oxide and its rate of hydration when present in dolomitic hydrates. Much more information is to be presented in a detailed report which will be available later.

Dr. G. J. Fink of the National Bureau of Standards discussed rather briefly the research work being carried on there under National Lime Association auspices with special reference to plasters and mortars. This work was begun in 1942. The results on water retentivity were used in the preparation of a new minimum standard for hydrated lime for masonry purposes which was approved at the February, 1944, meeting of the board of directors.

A progress report on the work of the National Lime Association Research at the Massachusetts Institute of Technology was presented by Professor Walter C. Voss of the institute. He described the results of collating and analyzing the data obtained from investigation of the use of lime in concrete with the co-operation of Stanton Walker of the National Sand & Gravel Association, A. T. Goldbeck of the National Crushed Stone Association, and Alexander Foster, Jr. of the Warner Company. He pointed out certain general observations which are in agreement with previous studies, such as: Lime replacements of cement are especially advantageous with lean mixes with reference to compressive strength and modulus of rupture but are not as effective with rich mixes and for water-cement ratios of 0.50 or less, the water-cement ratio being based on weight. Concretes containing appreciable amounts of lime show slightly more wear due to abrasion than those containing little or no lime. When lime is used with wet aggregate, the concrete is somewhat more permeable than concrete containing no lime; while in the tests made with dry aggregate the permeability of all the concretes was increased, those containing lime were less permeable. Where lime was used up to 50 or 75 pounds, said Professor Voss, the concrete showed higher absorption than the plain cement concretes. In the freezing-and-thawing tests the concretes containing lime were less resistant than those containing no lime.

The speaker said that the use of lime reduced the over-all shrinkage over a long period of time and with alterations of wetting and drying.

The concretes containing lime showed greater workability than those without it. They could be more easily handled, transported and tamped with less segregation and less tendency to "bleed."

The board decided that the lime association should return to its former practice of mentioning, in the designation of mixes, first the cement content, second the lime content, and, finally, the sand content, in conformity with current usage. It decided also to adopt the method of referring to mix proportions in specifications by the number and weight of bags in the case of the cement and lime; thus: 1 bag cement (100 pounds): 2 bags lime (50 pounds each): to 9 of sand.

A resolution was then adopted to express the sense of loss felt by members of the association through the deaths of George R. Schenberger (J. E. Baker Company), Bert B. Williams (Western Lime & Cement Company), Curtis H. Trone (Thomasville Stone & Lime Company), Marion S. Ackerman and Carl H. Sonntag (Lawrence Portland Cement Company), J. L. Durnell (Knickerbocker Lime Company, now the Warner Company), L. H. Hartman (Valve Bag Company), Clifford L. Miller (Miller Lime Plant), and Bernard L. McNulty (Marblehead Lime Company).

President Stauffer suggested a program for research in mortar in the coming year involving promotional activities and supporting research activities. Among the former he listed a rewriting of the association's specification for mortar and the inclusion of a specification for masonry; amendment of the A. S. A. code for masonry, especially with reference to allowable stresses and the limits on the use of Type D mortar; the promotion of an association specification for mortar in federal, state,

municipal and private specifications; and continued promotion of the A. S. A. code for masonry. Among supporting research activities he included continuation of tests on the properties of mortars, such as water retentivity, bleeding, workability and volume change, and projected tests on the properties of mortar and masonry, with reference to bond, flexibility, autogenous healing, and water-tightness.

All the officers were re-elected, as well as the members of the executive committee.

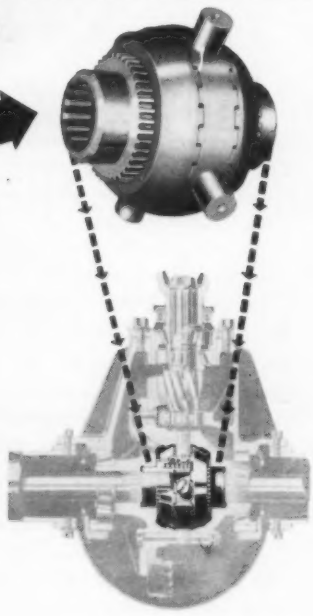
The following association members and guests were present:

T. R. Boyd, Office of Price Administration, Washington, D. C.
H. D. Brigstocke, Thomasville Stone & Lime Co., Dover, Pa.
W. Vernon Brumbaugh, National Lime Assn., Washington, D. C.
Reed C. Bye, Warner Co., Philadelphia.
L. R. Cambron, Cummer Lime Manufacturing Co., Jacksonville, Fla.
B. L. Corson, G. & W. H. Corson, Inc., Plymouth Meeting, Pa.
F. J. Collins, Kelley Island Lime & Transport Co., Cleveland.
Dean D. Crandell, National Gypsum Co., Buffalo, N. Y.
J. A. Dunaway, Peery Lime Co. Inc., North Tazewell, Va.
A. R. Dunning, Strasburg Lime Co., Inc., Strasburg, Va.
G. J. Fink, National Bureau of Standards, Washington, D. C.
Burton A. Ford and Mrs. Ford, Valve Bag Co., Baltimore.
R. G. Greeves, Kelley Island Lime & Transport Co., Cleveland.
John A. Gruber and Mrs. Gruber, Valve Bag Co., Baltimore.
J. S. Hedrick, Riverton Lime & Stone Co., Riverton, Va.
C. C. Loomis, New England Lime Co., Adams, Mass.
J. H. McNamara, Eagle Rock Lime Co., Eagle Rock, Va.
A. B. Miner, National Gypsum Co., Buffalo, N. Y.
Abram F. Myers, Washington, D. C.
Bror Nordberg, *Rock Products*, Chicago.
Stanley A. Phillips, PIT AND QUARRY, Chicago.
E. C. Powers, Marble Cliff Quarries Co., Columbus, O.
Nathan C. Rockwood, *Rock Products*, Chicago.
Mr. Rogers, Riverton Lime & Stone Co., Riverton, Va.
S. C. Snead, Kimbalton Lime Co., Inc., Shawsville, Va.
W. W. Sprague, National Mortar & Supply Co., Pittsburgh, Pa.
Howard R. Staley, Massachusetts Institute of Technology, Boston.
S. Walter Stauffer, National Lime Assn., Washington, D. C.
Walter C. Voss, Massachusetts Institute of Technology, Boston.
William A. Wilson, PIT AND QUARRY, New York.
Fred D. Witmer, Ohio Hydrate & Supply Co., Woodville, O.

The Monolith Cement Company has filled an order for the U. S. Navy for 125,000 barrels of cement, which is being shipped to the Gilbert Islands in the South Pacific, recently captured from the Japs.

NEED TRACTION?

Here's Your Answer



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(Lime Spreading Operations shown)

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WRITE FOR DETAILS and for models now available to users of essential civilian vehicles with Limitation Order Certificate L-158.

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In U. S.: Sold by TRUCKSTELL DISTRIBUTORS • In Canada: H. V. WELLES, LTD., Windsor, Ont.

Consider sensibly your use of Air Compressors

• How many operations do you have where costly, cumbersome compressors could be replaced with low-cost, flexible Smiths? How much time and money will you save with Smiths that are easily moved from one job to another and use only 1 gal. of gasoline an hour. *This thinking deserves your serious consideration.*

Smith Compressors are admirably equipped to give you all the power you need for most compressor work. Made with FORD Motors, standard parts and the famous Smith Compressor Head, they are sources of satisfaction to users everywhere. . . . Low initial cost, operating cost and maintenance. Capacity easily varied for different jobs. Repairs and parts available everywhere. Automatic unloading and idling; self-starter; no couplings, belts, clutches or gears to cause trouble.

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GORDON Smith & CO. Incorporated

481 College St., Bowling Green, Ky.

PERSONAL MENTION

W. W. Mein, Jr.

WM. WALLACE MEIN, JR., has been appointed by Governor Earl Warren of California to represent the non-metallic mining interests on the California State Mining Board. Mr. Mein, as vice-president of the Calaveras Cement Company which has its plant at San Andreas in the historic Mother Lode district of California, has many contacts with the non-metallic mining industry.

H. H. BUCHANAN, formerly assistant general sales manager and acting export manager for the Thew Shovel Company, Lorain, Ohio, has been appointed general sales manager of the LaPlant-Choate Manufacturing Company, Inc., Cedar Rapids, Iowa, manufacturers of earthmoving and land clearing equipment for Caterpillar-built tractors. He succeeds H. N. Graves, who resigned last June.

A. M. GUTHRIE has been advanced from eastern district manager to field sales manager of the Buckeye Traction Ditcher Company. His headquarters will be at the plant at Findlay, Ohio but, as postwar plans crystallize, he will travel extensively.

M. L. AVERY, until recently connected with the Cape Girardeau, Missouri, cement plant, and Mrs. Avery have celebrated their golden wedding anniversary in that city. Members of the family arranged a dinner in their honor. They were married at Holcomb, Missouri, March 31, 1894, and since 1919 have been residing in Cape Girardeau.

MARK A. TINKER, who has been general superintendent of the Wyoming Sand & Stone Company, Scranton, Pennsylvania, for several years, has resigned to enter the coal-mining field. His successor is Arthur C. Caldwell.

N. A. WESTON who has been associated with the Link-Belt Company of Chicago since leaving the University of Wisconsin, has been appointed general manager of the Chicago Steel Foundry Company, Chicago.

GEORGE KIRP on January 1 became plant superintendent for the Green Bag Cement Company of Pennsylvania, Neville Island, Pennsylvania. He formerly had been associated with the Petosky Portland Cement Company since 1935 as chemical engineer and assistant superintendent.

PAUL B. REINHOLD, president of the Atlas Equipment Corporation, Pittsburgh, has been appointed a member of the Post-War Committee of the National Association of Manufacturers.

ALBERT T. HUIZINGA has been elected vice-president and treasurer of the National Supply Company, Pittsburgh. He joined the company as treasurer, less than a year ago, coming from Montgomery Ward & Company, Chicago.

W. S. ROGERS, president and general manager of the Georgia Sand & Stone Company, Cartersville, Georgia, is now a lieutenant in the Navy and is stationed at the Pensacola Air Base. In his absence the affairs of the company are being managed by J. L. PROCTOR.

J. W. MOZLEY is now general manager of the Atlanta Aggregates Company, Atlanta, Georgia, succeeding the late W. M. Center. The concern, formerly in the aggregates business, is now engaged exclusively in the production of ready-mixed concrete and ready-mixed mortar.

JAMES RYAN and IRA BARTLETT, veteran employees of the Hudson, New York, plant of the Universal Atlas Cement Company, have been retired on pensions after completing 35 and 30 years of service, respectively, with the company.

E. W. Moorehouse

E. W. MOOREHOUSE will retire as Philadelphia district manager of the Atlas Powder Company's Explosives Department July 1, 1944, after 44 years of continuous service with the explosives industry. He has been with Atlas since its organization and has been manager of the Philadelphia district offices of Atlas for 29 years. Mr. Moorehouse has been a pioneer of the modern use of explosives and his experience closely

parallels the development of what might be termed "control blasting." In his early years with the industry high-strength dynamites with plenty of power were the rule. It has been during his association with the industry that the more heaving, slower type of explosives have been developed. He was one of the early pioneers in the use of the detonating fuse now called "Primacord."

J. H. MAYER, who has been on leave of absence for the past two years as project engineer on an ammunition depot and an airport job in Alabama, has returned to his duties as chief engineer of the Alabama Asphaltic Limestone Company, Birmingham. The company's plant and quarry are situated near Margerum, Alabama.

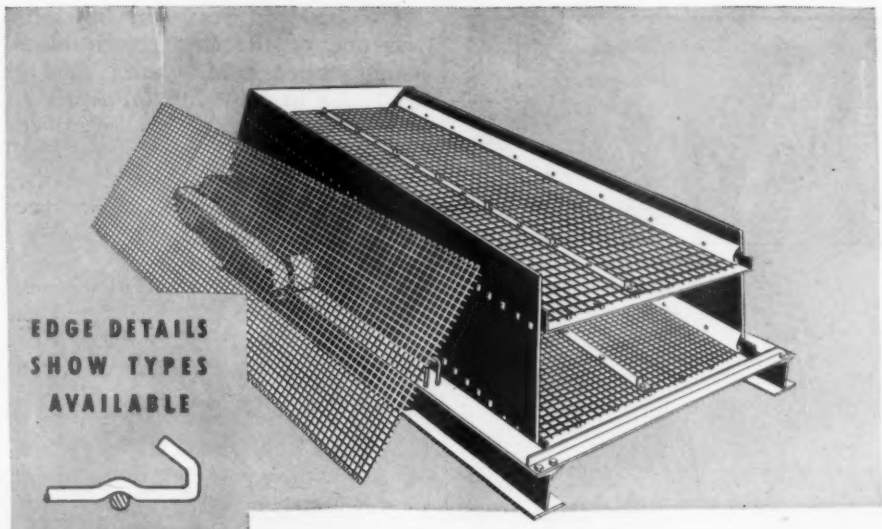
Thomas Backus

THOMAS BACKUS, formerly chief engineer for the Fuller Manufacturing Company at Kalamazoo, Michigan has been made chief engineer of R. G. LeTourneau, Inc. Prior to his Fuller affiliation, Mr. Backus was with General Motors, Willys-Overland, Spicer Manufacturing and Clark Equipment Companies.

WILLIAM S. GILES, formerly sales manager, Iron City Sand & Gravel Corporation, Pittsburgh, has been elected president. He has been connected with Iron City interests since 1928, including Iron City Sand & Gravel Corporation, Vang Stone Company, Vang Ready Mixed Concrete Company, and River Shipping & Supply Corporation.

OBITUARY

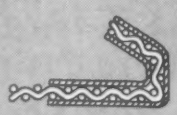
GEORGE S. BRIGHAM, 64, president of the Buffalo Crushed Stone Corporation, Buffalo, New York, since 1941, died April 11 in a Buffalo hospital. Mr. Brigham had lived in Buffalo since 1916. At one time he was a district engineer for the Portland Cement Association and in that capacity assisted with the construction of numerous highways in the Buffalo district. He was an executive of Buffalo Blacktop Pavements, Inc., when it was taken over by the Buffalo Crushed Stone Corporation in 1940.



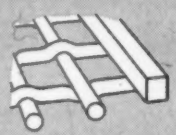
EDGE DETAILS SHOW TYPES AVAILABLE

Type 1: Turned Edge. (illustrated above).

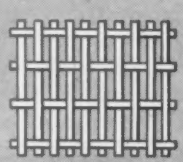
Type 2: Metal Reinforced Edge.



Type 3: DoubleMetal Reinforced Edge.



Type 4: Square Bar.



Above — two types from the wide list of Roebling Woven Wire Screen weaves available.

Top: rectangular mesh.

Lower: square mesh.

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YOU CAN ORDER YOUR SHAKER-SCREENS FROM THE *Wire Specialists!*

Turned edge or metal-edge screens are now made to your specifications in your choice of four types, by Roebling. The men, and the wire mills, and the know-how that have made the name of Roebling world-famous in wire are ready to supply screens in the type you want, made of Roebling Woven Wire in the mesh size, type of wire, and wire diameter that meets your needs. Write for your copy of the new folder on Roebling Woven Wires, and send specifications for the tailor-made screens needed for your equipment.

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Branches and Warehouses in Principal Cities

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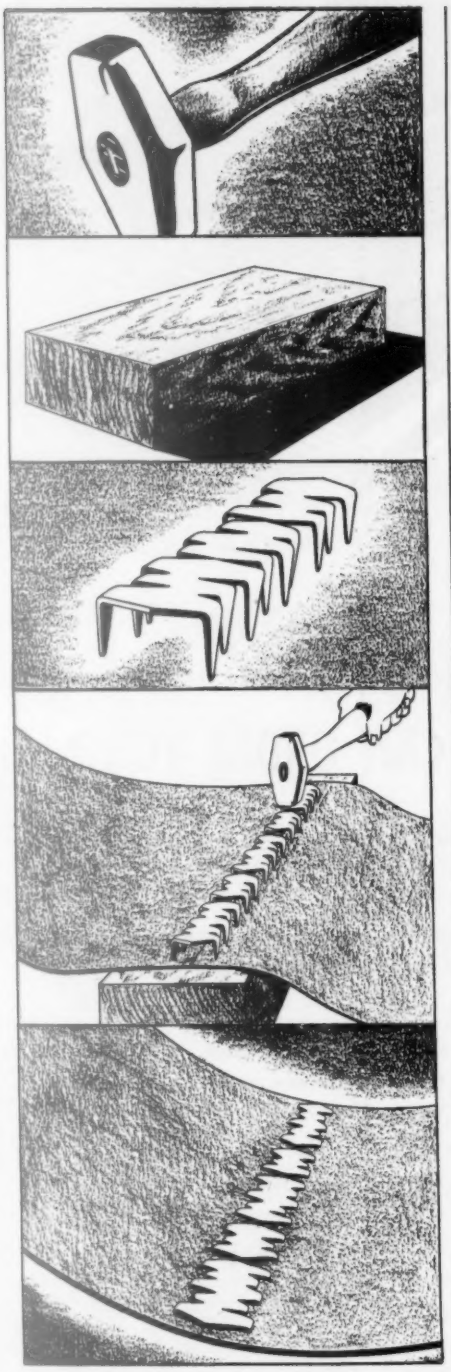
PACEMAKER IN WIRE PRODUCTS

WIRE ROPE AND STRAND • FITTINGS • AERIAL WIRE ROPE SYSTEMS • SUSPENSION BRIDGES AND CABLES • COLD ROLLED STRIP • HIGH AND LOW CARBON ACID AND BASIC OPEN HEARTH STEELS • ROUND AND SHAPED WIRE • ELECTRICAL WIRES AND CABLES • WIRE CLOTH AND NETTING • AIRCORD, SWAGED TERMINALS AND ASSEMBLIES



BRISTOL'S BELT FASTENERS

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THE BRISTOL COMPANY
137 Bristol Road, Waterbury 91, Conn.
DISTRIBUTORS EVERYWHERE

CHARLES J. STEMPER, 86, who was one of the first cement-block manufacturers in Milwaukee, died at his home in that city on April 7. From 1911 through 1914 he served as assemblyman in the city of Milwaukee. He was a member of the South Side and the Milwaukee County Old Settlers clubs.

GUILFORD M. HUMPHREY, 58, manager of the Logsdon Sand & Gravel Company, Hannibal, Missouri, died suddenly at his home in that city, April 18.

MORRIS D. SCHAFF, 77, president of the Springfield-Pekin Sand & Gravel Company at Springfield, Illinois, died in that city recently. He made his home at the Hotel Abraham Lincoln.

LESLIE J. BENNETT, president of the old Buffalo Cement Company, died April 24 after a week's illness. He was 83 years old.

JAMES LEE SANDERS, 61, a watchman at the Marblehead Lime Company at Quincy, Illinois, died at his home in that city recently. He had been under the care of a physician for some time.

EDWARD S. GROVER, 63, who had been connected with the Pekin-Springfield Sand & Gravel Company at Pekin, Illinois, died recently.

HARRY A. LINCH, manager of the engineering department of The Dorr Company, New York, passed away suddenly on April 29th. Mr. Linch had been associated with The Dorr Company since 1921, serving in a number of capacities in the United States and in South America and Europe. In his position as manager of the engineering department he collaborated in all the major mechanical developments of the company during the past decade.

TRAFFIC News Digest

Central Freight Association

Docket 75629 (2)—Sand, all kinds, and gravel, in open top cars. Establish on, from Havens, Ohio to Piqua, Ohio 116c per N. T. via N.Y.C. & St. L. R. R. —Lima, Ohio, B&O R. R.

Docket 75606 (1)—(a) Stone, crushed, in bulk in open top cars, C. L. (b)—Agricultural limestone, unburnt, not ground or pulverized, in bulk, in open top cars, C. L. Establish on, from Speed, Ind., to destinations on the C. M. St. P. & P. R. R. in Ind., rates as shown in Exhibit E following:

EXHIBIT E
Crushed Stone and Agricultural Limestone,
From Speed, Ind.
(cents per net ton)

To C. M. St. P. & P. Stations	*Prop. Rate*
Bedford, Ind. and Shawswick, Ind.	110
Heltonville, Zelma, Norman, Alert, Sardinia and Westport, Ind.	105
Kurtz, Freetown, Surprise, Elizabethtown, Grammer, Ind.	99
Cortland, Reddington, Azalla, Ind.	94

Docket 75644 (2)—Slag, product of phosphorous furnaces, crushed, granulated or not crushed, C. L., min. wt. 90 per cent. of the marked capacity of car used. Establish on,

(Rates in cents per net ton)

To—	From *Louisville, Ky.* Prop.	*Cincinnati, Ohio* Prop.
Jeanette, Pa.	265	240
Port Allegany, Pa.	330	305
Connellsville, Pa.	275	250
Washington, Pa.	210	185
Mt. Pleasant, Pa.	275	250
Olean, N. Y.	320	295
Rochester, N. Y.	340	315
Elmira, N. Y.	375	350
New York, N. Y.	440	415

Docket 75645 (2)—Sand, as described in Exhibit A following. Establish on, from Gary-Michigan City Group, viz.: Gary, Porter, Calumet, Michigan City, Miller, Dune Park, Willow Creek, Cris-

PERFORATED METAL SCREENS
FOR SAND, GRAVEL STONE, ETC.

Manufactured exactly to your specifications.

Any size or style screen, in thickness of steel wanted with any size perforation desired.
We can promptly duplicate your present screens at lowest prices.
Prompt Shipment

CHICAGO PERFORATING CO.
2435 W. 24TH PLACE CHICAGO, ILL.
Telephone CANAL 1459

man, Crocker, Ind., and Oak Hall, Michigan, to Republic, Ky., 341c; Dunham, Ky. 352c; Omar, W. Va., 330c per N. T.

Docket 75659 (2)—Sand, moulding, etc., as described in Exhibit C. Establish on, from Michigan City, Ind. Group to Rochester, Batavia, Niagara Falls, Lockport, Depew, Harriet, Olean, Silver Creek and Medina, N. Y., rates as shown in Exhibit C.

Docket 75666 (2)—Slag, crude, granulated, commercial crushed (the product of iron and steel furnaces), also ashes and cinders in open top equipment, C. L. Establish on, from Hubbard, Ohio to Oil City, Pa. 99c; to Van, Pa., 110c; from Youngstown, Ohio to Oil City, Pa., 110c, and to Van, Pa., 121c per N. T., subject to Ex Parte 148 increase (suspended), via N.Y.C. R.R. or Erie R.R. direct.

Docket 75667 (2)—Sand (except blast, core, engine, filter, fire or furnace, foundry, glass, grinding, ground, loam, molding, molding-naturally bonded, polishing, pulverized or silica) or gravel in open top cars, C. L. Establish on, from Warsaw, Ind., to Middlebury, Ind., 77c per N. T., subject to ExParte 148 increase (suspended), via N.Y.C. direct.

Docket 75694 (2)—Limestone, agricultural and agricultural limestone screenings, unburnt, in bulk, in open-top cars, C. L., min. wt. 90 per cent. of marked capacity of the car, except when car is loaded to full cubical or visible capacity, actual weight will apply. Establish on, from Luckey, Ohio, to Cincinnati, Ohio 160c; to Hamilton and Middletown, Ohio 149c per N. T. Route: To Cincinnati and Middletown, Ohio via N.Y.C. (W), Berwick, Ohio, N.Y.C. (C). To Hamilton, Ohio via N.Y.C. (W.), Toledo, Ohio and B&O R. R.

Docket 75778 (2)—Dolomite, roasted (refractory dolomite, in granular form, treated or untreated, checked, and/or burned to a dead state) C. L., min. wt. 60,000 pounds. Establish on, from Narlo, Ohio to Milwaukee and Racine, Wisconsin 308c per N. T.

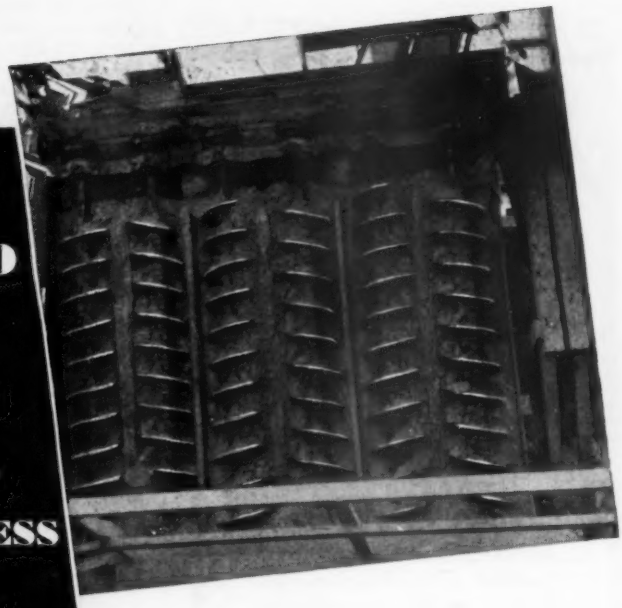
Docket 75779 (2)—Limestone, ground or pulverized, C. L., min. wt. 60,000 pounds. Establish on, from Worthington, Pa., to pts. on B&O and P. & S. R. R. in Pa., rates as shown in Exhibit F, via B&O R. R. direct and via B&O R.R., West Mosgrove or Dellwood, Pa., and P&S R. R.

Docket 75787 (2)—Limestone, ground in bulk in open top cars, C. L. min. wt. 90 percent. of marked capacity of car, except when car is loaded to full cubical or visible capacity, actual weight will apply; (b) agricultural limestone, unburnt, not ground or pulverized, in bulk, in open top cars, C. L., min. wt. 90 per cent. of marked capacity of car, except when car is loaded to full cubical or visible capacity, actual weight will apply. Establish on, from Speed, Ind., to destinations on the N.Y.C. (C) R.R. in Ind., rates as shown in Exhibit E.

Docket 75787 (2)—Limestone, ground or pulverized, unburnt, in closed cars, C. L., min. wt. 60,000 pounds. Establish on, from Mitchell, Ind., to Charlestown, Ind., 127c per N. T.

Docket 75784 (2)—Slag (a product of electric furnaces) having value for agricultural purposes only, C. L., min. wt. 90 per cent. of the marked capacity of car except when car is loaded to full cubical or visible capacity, actual weight will apply. Establish on, from Alloy, W. Va., to various destinations in West Virginia, rates as shown in Exhibit D.

Docket 75794 (2)—Lime, common,

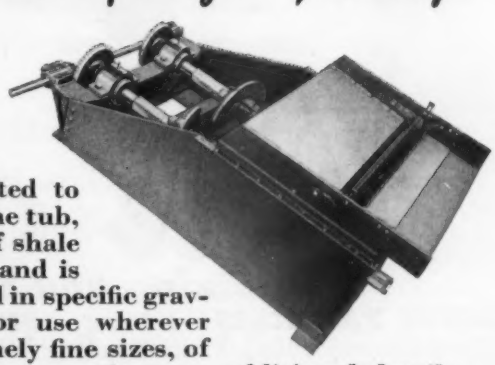


EAGLE WASHED SAND PASSES 99½% CLEANLINESS TEST!

A long-time user of Eagle Sand and Gravel Screw Type Washers says, "We have used the 'Spiral Screw Washer' for twelve years without complaint. *Our material, classified with this washer, passes the State specifications and has a cleanliness test of* 99½% which is without a doubt very high . . . In regard to operating cost, the Eagle Washer has proved its worth many times over. Operating costs are absolutely nothing compared to the efficiency and output of the Spiral Screw Washer."

EAGLE IRON WORKS
133 Holcomb Avenue
Des Moines, Iowa

Shale Remover Takes Out Contamination of Close Specific Gravity



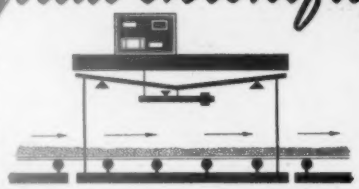
For plants having a high percentage of foreign material of similar specific gravity in their aggregate, the Eagle Shale Remover attachment for screw washers is a money-maker. Fitted to the water discharge end of the tub, the Shale Remover takes off shale and other foreign material and is adjustable to any differential in specific gravity. It is recommended for use wherever graded sizes, but not extremely fine sizes, of materials are produced. Let us give you additional details.

Details on Shale Removers and many other Eagle profit-earning sand and gravel equipments are given in Catalog 44. Send for a copy.

EAGLE ***Specialized Sand and Gravel Equipment***
"SWINTEK" DREDGE LADDERS — SCREW WASHERS
LOG WASHERS — DEHYDRATORS — SAND TANKS
CLASSIFIERS — REVOLVING SCREENS

EAGLE IRON WORKS
DES MOINES, IOWA
"SERVING INDUSTRY FOR OVER SEVENTY YEARS"

BUILDERS
Toledo Chronoflo



CONVEYOR SCALE

Dependable equipment for *accurately* weighing and/or blending gravel, cement, crushed rock, limestone or sand, *in transit*, on conveyor belts. Write to Builders-Providence, Inc. (Division of Builders Iron Foundry), 9 Codding St., Providence 1, R. I. for Bulletin 322.

Sincerely Yours.
BUILDERS-PROVIDENCE

hydrated, quick or slaked, C. L. Establish on, from Mosher and Ste. Genevieve, Mo., to Paw Paw, Mich., 20c, min. wt. 30,000 pounds; 17c min. wt. 50,000 pounds. Route: 1615—Via M. I. R. R., Centralia, Ill., I. C. R. R., Chicago or Matteson, Ill., P. M. Ry. 1616—Via M. I. R. R., Salem, Ill., C. & E. I. R. R., Chicago, Ill., P. M. Ry.

Docket 75801 (2)—Limestone, agricultural, unburned (not ground or pulverized), in bulk in open top cars, C. L., min. wt. 90 per cent. of the marked capacity of the car, except when car is loaded to full cubical or visible capacity, actual weight will apply. Establish on, from Marblehead, Ohio to Spencerville, Ohio, 127c; Ohio City, Ohio, 138c per N. T.

Route: To Spencerville, O.; Via L. & M., Danbury, O., N.Y.C. (W), Sandusky, O., N.Y.C. (C), Kenton, O., Erie R. R. To Ohio City, Ohio; Via L. & M., Danbury, O., N.Y.C. (W) Bryan, O., N.Y.C. (C); or via L. & M., Danbury, O., N.Y.C. (W), Sandusky, O., N.Y.C. (C), Kenton, O., Erie R.R.; or via L. & M., Danbury, O., N.Y.C. (W), Toledo, O., N.Y.C. & St. L.

Docket 73818 (2)—Sand (except sand, molding, bonded (naturally or otherwise), and except ground or pulverized sand), or gravel; in open top equipment, without tarpaulin or other protective covering, C. L. Establish on, from Logansport, Pa., to Youngstown, Ohio, 116c; from Cheswick and Clairton, Pa., to Toledo, Ohio 220c per N. T., subject to Ex Parte 148 (suspended).

Docket 75827 (1)—Gravel, sand (except blast, core, engine, filter, fire or furnace, foundry, glass, grinding or polishing, loam, moulding and silica) in open top cars. C. L. Establish on, from Indianapolis, Ind., to Bourbon, Ind., 127c per N. T.

Docket 75828 (2)—Sand, as described in Exhibit B. Establish on, from Gary-Michigan City Group, viz.: Gary, Porter, Calumet, Michigan City, Miller, Dune Park, Willow Creek, Crisman, Crocker, Ind., and Oak Hill, Michigan to Consolidation No. 32 (Shinnston), W. Va., 341c per N. T.

Docket 75833 cancels W. D. A. 75779 (2)—Limestone, ground or pulverized, C. L., min. wt. 60,000 pounds. Establish on, from Worthington, Pa., to points on B&O and P&S railroads in Pennsylvania, rates as shown in Exhibit D. Routes: Via B&O R. R. direct. Via B&O R. R., West Mosgrove or Delwood, Pa., and P&S R. R.

Illinois Freight Association

Docket ORMV 1245-251-Pt. 3-A—Lime, common, hydrated, quick or slack, C. L., from Chicago, Ill.:

To	(1)	(2)
West Palm Beach, Fla.	$7.20	$9.00
Tampa and Port Tampa, Fla.	6.85	8.56
Miami, Fla.	7.46	9.33

(1) Minimum weight 50,000 pounds.
(2) Minimum weight 30,000 pounds.
Subject to fourth section relief being obtained.

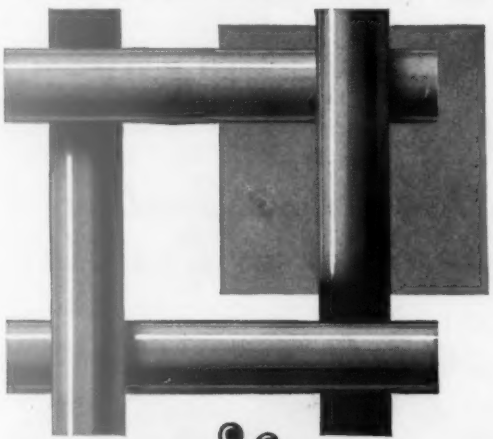
Docket IRC 511-150—Stone, crushed or rough quarried, also strippings of stone quarries, in straight or mixed C. L., min. wt. 90 per cent. of market capacity of car, except when cars are loaded to full visible or cubical capacity, actual weight will apply but not less than 40,000 pounds, to stations on Wab. R.R. in Illinois (rates in cents per ton), to representative points:

From E. St. Louis to	*Prop.*
Ivesdale, Champaign, Sulu and Gibson City	139
Tilton	163
From Krause to (Ill.)	
Ivesdale, Champaign, Sulu and Gibson City	150
Tilton	164
From Valmeyer to (Ill.)	*Prop.*
Ivesdale, Champaign, Sulu, Gibson City	156
Tilton	170
From Prairie DuRocher to (Ill.)	
Ivesdale, Champaign, Sulu, and Gibson City	161
Tilton	175
From McCook to (Ill.)	
Ivesdale, Champaign	139
Gibson City and Sulu	111
Tilton	153

Docket IRC 511-156—Crushed stone, rip-rap and rubble stone, C. L.: To re-establish rates (increased under Ex Parte 123), which were formerly in effect from Louisiana, Mo., in Alton R. R. Tariff 1440-A and which were cancelled by Tariff 1440-B on April 23, 1941, and from Pearl, Ill., in Alton R.R. Tariff No. 1400-U and which were cancelled by Tariff 1400 on May 1, 1936, account obsolete.

Docket IRC 511-158—Limestone, crushed or ground, unburned, C. L., from Louisiana, Mo., and Pearl, Ill., to Racine, Milwaukee, Burlington, Jefferson, Oconomowoc, Madison, etc. Wisc. To establish rates reflecting the same differential under Docket 25220, carriers revised scale as the present rates from points in the Quincy, Ill., Group to Milwaukee and Madison, Wisc. and to provide the same grouping of other destination points, as aforementioned.

Docket IRC 511-162—Stone, crushed or ground, min. wt. 90 per cent. of marked capacity of car, except when



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SMALL PARTICLES—*(Light Minerals, Sand, Refractories, Abrasives).* "Buffalo Stainless Steel" Wire cloth in bolting grade. Free bolting. Rustproof. Fast screening with long life in all weather.

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526 TERRACE BUFFALO 2, N. Y.

loaded to full visible capacity, in which event actual weight will govern, from Elmhurst, Ill., to Aurora, Ill. Present 65c ton. Proposed 55c net ton.

Docket IRC 511-161—Sand and gravel, C.L., as described in Item 150 of CRI&P Tariff 26061-P, min. wt. 90 per cent. of marked capacity of car, except when car is loaded to full visible capacity actual weight will apply but not less than 40,000 pounds, from Chillicothe, Ill., to Mechanicsburg, Ill. Present $1.29 net ton. Proposed 97c net ton.

Southwestern Freight Bureau

Docket 33432 (2)—Chert, gravel, marl, oyster shell dust, etc., Memphis, Tenn., to Helena, Ark. To establish rate of 90 cents per ton on sand, gravel, etc. from Memphis, Tenn., to Helena, Ark.

Transcontinental Freight Bureau

Docket 1657 (shipper)—Crude brucite and crude magnesite, C. L., E. B., minimum weight: Request that Item 5142, Tariff 3, be amended to provide for flat minimum weight of 100,000 pounds, in lieu of present capacity of car minimum weight rule.

Trunk Line Association

Docket 42173 (shippers)—Limestone, ground or pulverized, C. L., min. wt. 60,000 pounds from East Brady, Pa., to numerous points in western Pennsylvania within radius of 150 miles from Brady, Pa., as per exhibit, copy of which will be furnished on request. Examples—Lawsonham, Pa., 66c; Herman, Pa., 127c; Cobham, Pa., 154c; Waynesburg, Pa., 182c, etc. Reason: Comparable with rates applying from and to other points.

Docket 42181 (increase-carriers)—Limestone, ground or pulverized, C. L., min. wt. 60,000 pounds, from Jamesville, N. Y., to Montrose, Pa., $2.04 per net ton, in lieu of present rate of $1.60 per net ton. Reason: To place rates on proper basis.

Docket 42193 (shippers)—Ferro manganese, C. L., min. wt. 56,000 pounds, from Sheridan, Pa., to Harrisburg, Pa., $1.79, in lieu of present rate of $2.08 per gross ton. Reason: Comparable with rates from other points.

Docket 42201 (shippers)—Limestone, ground or pulverized, C. L., min. wt. 60,000 pounds, from Worthington, Pa., to points on the B&O R.R. and P&S R.R. as per Exhibit, copy of which will be furnished upon request, in lieu of present class rates. Examples: Suter, Pa., to Robins, Pa., $1.49; Echo, Pa., 83c; Savan, Pa., $1.32 per net ton, etc. Reason: Comparable with rates from and to other points.

Docket 42220 cancels 42201 (shippers)—Limestone, ground or pulverized, C. L., min. wt. 60,000 pounds, from Worthington, Pa., to points on the B&O R.R. and P&S R.R., as per exhibit, copy of which will be furnished on request, in lieu of present class rates. Examples: Suter, Pa., $1.43; Echo, Pa., 83 cents; Savan, Pa., $1.32 per net ton, etc. Reason: Comparable with rates from and to other points.

Western Trunk Line

Docket D-11-103—Cement, hydraulic, portland or natural, etc., between points in W. T. L. C. territory. Description—present, description now published in Item 235-D of WTL Tariff 132-J; also in individual lines' tariffs. Proposed—Cement, hydraulic, portland or natural, also mortar cement, masonry cement and dry building mortar, straight or mixed carloads, minimum weight 50,000 pounds, except that when marked capacity of car used is less, the actual weight but not less than 40,000 pounds will apply. NOTE: Orders for cars of less than 50,000 pounds capacity will not be accepted by the carrier. (By shipper)

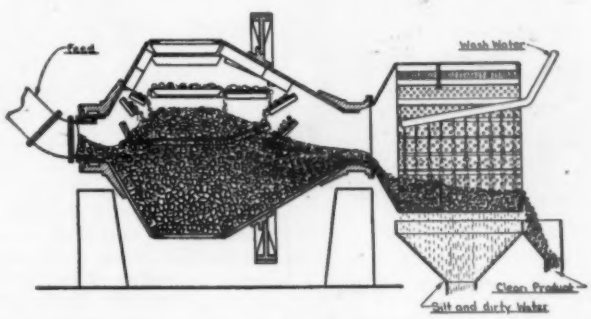
Docket E-41-622—Limestone, crushed or ground, C. L., from Louisiana, Mo. and Alton and Pearl, Ill., to Un. Pac. R.R. stations in Wyoming (Index Nos. 1 to 78, inclusive) as listed in item 2110, Un. Pac. R.R. Tariff No. 3040-E. Proposed—Rates from Louisiana, Mo., and Pearl, Ill., same as from Quincy, Ill., and Hannibal, White Bear and Columbus, Mo.; from Alton, Ill., 1c higher than from Louisiana, Mo.

Docket X-E-43-171—Stone, viz.: Flintstone (silex) linings; flintstone or quartzite pebbles; stone grinding blocks, pebble mill. In straight or mixed carloads, between points in W.T.L. territory, also from W.T.L. territory to Official, Southwestern and Southeastern territories; also to Eastern Canada, Ontario and east. Proposed—Column 17½, except to Official territory and eastern Canada, Column 20. To apply in straight or mixed carloads, minimum 50,000 pounds. (By shipper)

Docket E-41-621—Stone, crushed, ground or pulverized, unburned, C. L. min. wt. 60,000 pounds, from Pearl, Ill., and Louisiana, Mo., to points shown in C.F.A. territory. Proposed—Rates based on Docket 25220 revised scale increased 10 per cent. (By shipper)

Docket E-41-624—Gravel, min. wt. 90 per cent. of marked capacity of car, except that when car is loaded to full visible capacity actual weight will apply, from Pueblo, Colorado, to Scott City, Kan. Proposed—$1.94 per ton of 2,000 pounds. (By shipper)

Docket E-41-625—Sand, gravel, strippings, sand pit or gravel pit. Proposed—To add Portage, Wisconsin to Item 3480 of WTL Tariff 1-Z on the same basis as provided from Browntown, Wis., viz.: Group A 14c per 100 pounds;



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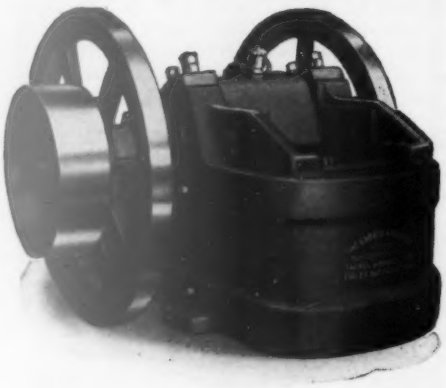

EARLE C. BACON, Inc.
17 John St. New York, N. Y.

Group B 14c per 100 pounds; Group C 18c per 100 pounds. Also amend Item 3427 of WTL Tariff 1-Z by addition of Atchison, Kan., Ft. Leavenworth, Kan., Leavenworth, Kan., North Kansas City, Mo., and St. Joseph, Mo., as points of destination on same basis of rates which now applies to Kansas City, Mo., viz.: 14c per 100 pounds. (By shipper)

Docket E-41-626—Sand, silica, from Portage, Wis., to Brownsville, Eagle Pass, El Paso and Laredo, Tex., on traffic destined Mexico. Proposed—Amend Item 1690 and 2050 of Southwestern Lines' Tariff 112-N, Agent Peel's ICC. No. 3612 by addition of Portage, Wis., at same rates as now provided from Ottawa, Ill. (By shipper)

Docket E-41-628—Sand and gravel-stripping, sand or gravel pit, minimum carload weight 90 per cent. of marked capacity of car, except that when actual weight of shipment loaded to full visible capacity of car is less than 90 per cent. of marked capacity of car, the actual weight will be the minimum weight. In no case shall the minimum weight be less than 40,000 pounds, from Portage, Wis., to Centerville, Ia. Proposed—14c per 100 pounds. (By shipper)

Retires from Company

After 27 years of service with Barber-Greene Company, Aurora, Illinois, practically all of that time as secretary, D. G. McIlwraith has announced his retirement, effective immediately. John M. Spence, formerly chief auditor, has been elected to the Board of Directors and to the office of Secretary.

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Legal Decisions

Law of Municipal Contracts

Modern higher courts hold that a municipality is bound by its contracts duly entered into within the scope of its statutory powers. Contracts not within this simple rule are void. However, when considering the legal obligations of a municipality or county under a contract of sale the court always endeavors, when possible, to place the contract on a basis of ordinary contracts.

For example, in *Standish Pipe Line Co. v. Oklahoma County Excise Board,* 14 Pac. (2d) 281, reported November, 1943, it was shown that a board of county commissioners, under date of August 5, 1941, entered into a contract with a seller whereby the latter agreed to furnish the county a quantity of road material in the nature of rock asphalt at $5.25 per ton, to be delivered within 10 days after written notice of order from the county engineer. The seller further agreed to furnish the material to the county at the designated price "up until June 30, 1942." Actually the county engineer did not order this material until July, 1942.

Certain taxpayers filed suit to invalidate the sale contract and prevent the county from paying the contract price to the seller on the ground that the contract, of August 5, 1941, never materialized into a legal obligation during the fiscal year 1941-1942, thereby leaving the purchase order as an illegal charge against the general fund appropriation for that fiscal year.

Actually, irrespective of the tax-fund suit, the important consideration was whether the written order of October 15, in conjunction with the August 5 contract, constituted a valid contract in consideration of the fact that the county engineer failed to order out the materials until July, 1942.

At first hand the details of this case appear to present complications. However, simplified the facts are as follows: August 5, 1941, a contract was made for the purchase of a specified quantity of rock asphalt. It was agreed that the materials would be furnished at the designated price up to June 30, 1942. However, the county engineer did not place the definite order until October 15, 1941, and failed to order shipment until July 23, 1942. But the important fact is that the seller ac-

cepted the order of October 15, 1941, and shipped the materials after receiving the delayed July 23, 1942, confirmation. Therefore, this accepted order automatically resulted in a legal completion of the August 5, 1941, contract on October 15, 1941.

Obviously, the seller could have refused to make delivery upon receiving the July 23, 1942, order because the original contract stated that the seller agreed to make delivery on orders filed up to June 30, 1942. However, when the seller accepted the July 23, 1942, order he automatically extended the specified June 30, 1942, privilege date.

Now, the important question presented the court, in addition to the above explained facts, was: Was this contract legally made August 5, 1941, when the contract was signed, or July 23, 1942, when the order was placed by the county engineer, or October 15, 1941, the date the county engineer notified the seller to enter the county's order for 3,000 tons of rock asphalt as per contract of August 5, 1941.

The higher court held the seller entitled to recover payment for the materials because the contract was legally made on October 15, 1941, when the county engineer notified the seller to enter the county's order for the rock asphalt. This court said:

"Whether the contract for sale became an executed one in the fiscal year 1941-1942 and therefore a legal obligation of the county depends upon whether title passed during that year. There is ample evidence to show that the parties considered the sale as completed by the engineer's order of October 15, 1941."

The legal lesson to be learned by this decision, is: There is many a slip twixt the cup and the lip with respect to collecting for materials delivered to municipalities, counties and states.

For example, many state constitutions restrict the debts of municipalities. Generally, the language of these constitutions is that no city shall be allowed to become indebted in any manner or for any purpose to an amount, including existing indebtedness, in the aggregate exceeding a specified percentage of the value of its taxable property. Constitutional provisions of this nature are valid. Obviously, therefore, from the standpoint of public policy any and all contracts made in violation to this constitutional clause are void. This means that a city can not be held liable in damages for failure to fulfill the obligations assumed in violation to such a constitutional provision.

For illustration, in *Hancock v. Village of Hazel Crest,* 47 N. E. (2d) 557, reported July, 1943, the testimony disclosed that a seller sued a municipality to recover $13,340, as the reasonable value of services and materials rendered by him to the city in connection with the proposed construction of a new sewerage system or remodeling the old system.

It appears that it was the contemplation of the city officials to make the improvement under a state law which in substance provides that a municipality may by compliance with valid laws construct a sewerage system and pay for it out of revenue bonds which are limited in payment to revenues to be derived from the improvement itself.

However, the state constitution has a clause here which provides that no municipality shall become indebted for any purpose to an amount in the aggregate exceeding 5 per cent. of the value of the taxable property. If the sewerage system were constructed, the debt of the municipality would exceed 5 per cent. of the

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value of the taxable property and be prohibited by the state constitution. A majority of the votes cast on the election were unfavorable. Therefore, the municipality did not proceed with the construction of the system.

The seller filed the suit against the municipality and contended that the municipality must pay for the services he rendered, with respect to the proposed sewerage system. He contended, first, that if the city paid for the system out of revenue bonds payable from the revenue received from operation of the system, the city assumed no debt, and, secondly, that he was entitled to receive payment for his services although the city officials were not authorized by voters to contract to pay for such services.

The higher court refused to agree with these contentions and, in holding the seller *not* entitled to payment, said:

"It (municipality) shall not do this in any manner; neither by bonds, nor notes, nor by express or implied promises. Nor shall it be done for any purpose; no matter how urgent, how useful, how unanimous the wish. There stands the existing indebtedness to a given amount in relation to the sources of payment as an impassable obstacle to creation of any further debt, in any manner, or for any purpose whatever."

Also, see the case of *City of Litchfield v. Ballou,* 114 U. S. 190. The important and late higher court cases on this point of law are collected in 37 L. R. A., N. S., p. 1058. Numerous higher-court decisions are herein listed where sellers of nonmetallic materials were held not entitled to receive payment for materials purchased and used by municipalities, counties and states. Obviously, therefore, sellers who contract to sell materials to these public users must be certain that the law is in their favor. Otherwise, substantial losses may result. In a later article in these pages we shall review a series of late and leading higher court cases in which various sellers of non-metallic materials were held *not* entitled to recover any payment for materials. The reasons for non-payment will be clearly explained whereby readers may avoid similar losses.

Legal Rights of Purchaser

The general rule of law is that, in case the terms of the sale are breached by the seller, the buyer has several remedies among which he may choose. He may either (a) affirm the sale, notwithstanding the seller's breach, and proceed to carry out his part of the agreement; (b) he may rescind the sale contract and return the merchandise already received and recover anything already paid on the purchase price; (c) he may affirm the sale and, if he has been damaged by the breach of the contract by the seller, he may set off the amount of such damages where the seller sues for the balance of the purchase price; or (d) he may sue the seller for full damages. The purchaser must, however, elect between these various remedies and is bound by his election. But modern higher courts hold that if a purchaser retains the merchandise previously shipped to him he can not refuse to carry out his part of the agreement, although he may recover full damages caused him by the breach on the part of the seller.

For illustration, in the leading higher court case of *California Products Company v. Wadlow,* 118 Pac. (2d) 67, it was shown that a company sold certain materials to a buyer for the sum of $4,195. Legal controversy arose when the buyer became dissatisfied with the deal and attempted to rescind the contract on the grounds that the seller had made false statements to induce making of

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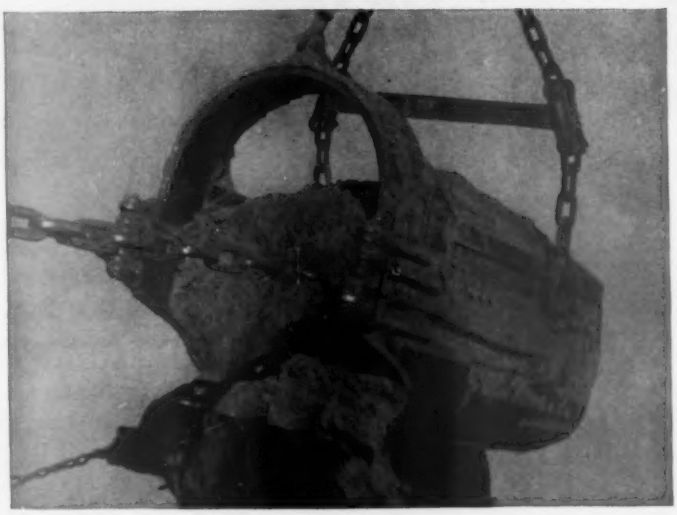

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- Manganese steel chains, fittings and reversible tooth points.
- All Welded construction . . . for greater strength and durability.
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the contract and, also, that the seller had breached this guarantee of the quality of the materials.

During the trial testimony was given by the buyer upon which the court relied and decided that the seller had not fulfilled his guarantee. Therefore, the court decided that the purchaser was entitled to recover from the seller the full purchase price, plus all damages sustained as a result of the seller's breach of the warranty. This court said:

"If the defendant's (purchaser's) evidence was clear and convincing that the plaintiff (seller) had committed the fraud alleged, then the verdict should be for the defendant."

Seller Liable

Generally, a seller is liable in damages where merchandise is sold under a false guarantee. And if a purchaser purchases guaranteed materials the law does not expect him to make *immediate* complaint that the guarantee is breached by the seller. For example, in *John Company v. Williams,* 46 N. E. (2d) 1, it was disclosed on October 20 a man, named Williams, *by letter,* offered to sell certain materials. Samples were sent to the purchaser. On the following day the seller, *by letter,* purchased the materials and paid for them in accordance with its undertaking. The materials were delivered, but the purchaser did not complain of the poor quality until 19 months later. The lower court considered all the testimony and held the seller liable to the purchaser for heavy damages and explained that a purchaser need not complain of a breached guarantee until he knows that the seller's guarantee actually has been breached.

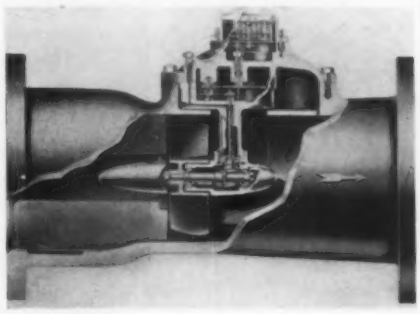
Also, see the leading case of *Milliken v. Thorndike,* 103 Mass. 382, where it was contended that the alleged misrepresentation was made by a seller. The latter argued that his statement or guarantee was not of such character that the purchaser should have relied upon it. The court said:

"If a statement is honestly made as a matter of opinion, judgment or estimate, it is not in law a false representation, although the matter thus stated should turn out to be untrue. But if a fact which is susceptible of knowledge is stated by a party as of his own knowledge, and such representation is relied upon as the basis of a contract, and damage results to the party deceived, it is a legal fraud, the consequences of which must be borne by him who makes the statement."

NEW MACHINERY and SUPPLIES

● Flow Meter

Builders-Providence, Inc., division of Builders Iron Foundry, has announced a new propeller-type flow meter for main line metering with many improvements,



Cutaway view of the flowmeter.

including streamline Venturi construction. This unit, called a Propeloflo meter, has an 8-blade bakelite propeller molded in one piece. Rotation is transmitted through spur and bevel gears. Shafts rotating in ball bearings assure maximum power to drive indicating and recording devices or proportioning chem-

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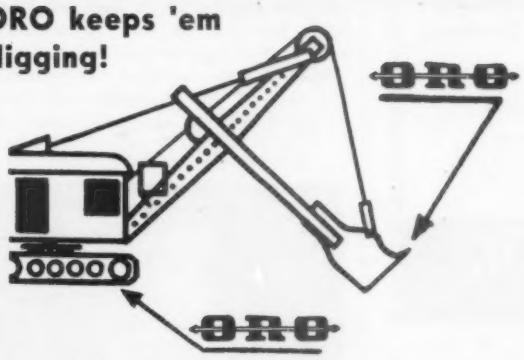

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We have specialized for over thirty-five years in automatic weighing equipment.

MERRICK SCALE MFG. CO. Passaic, N.J.

NEW HOLLAND

Hammer Crushers — Revolving Screens
Roll Crushers — Vibrating Screens
Jaw Crushers — Elevators
Conveyors, etc.

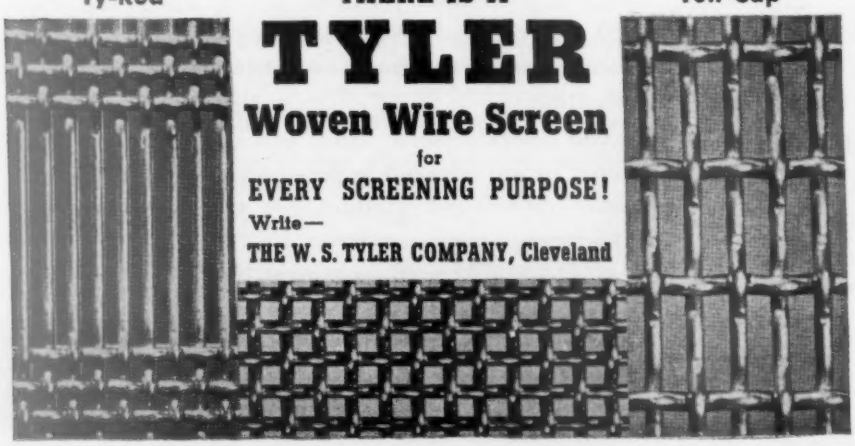
All Types and Sizes to Suit the Job

Write for bulletins.

Also Rebuilt Equipment

NEW HOLLAND MACHINE CO.
NEW HOLLAND, PENNSYLVANIA

Ty-Rod — THERE IS A — Ton-Cap



TYLER

Woven Wire Screen
for
EVERY SCREENING PURPOSE!
Write—
THE W. S. TYLER COMPANY, Cleveland

ical feeders. A Venturi throat evenly distributes the force of the flow against the full area of the propeller, resulting in improved accuracy throughout an exceptionally wide range of flow. Spiral flow is eliminated by straightening vanes just upstream of the propeller.

The propeller hub, bracket and nose are streamlined to reduce flow disturbance and divert fine grit, sand or scale away from the mechanism. Engineers will find the unit easy to service, it is said, owing to its "one-shot" lubrication system, the readily accessible stuffing box, and the ease with which the propeller mechanism may be removed from the line for inspection. A blank cover may be installed when the meter is removed.

• Gasoline Drill

The Syntron Company, Homer City, Pennsylvania, announces a new style, completely self-contained, gasoline hammer paving breaker type of demolition tool.

This hammer is comparable in power to the larger-sized compressed air paving breakers, weighs 96 pounds, is arranged for easy operation by one man and uses moil points, narrow chisels, gads, wide chisels, frost wedges, clay spades, backfill tamping tools, asphalt cutters, sheathing drivers or ground rod driving tools, etc., all with 1⅛ by 6-inch shanks.

Throttle control of the blow allows placing of the tool on the spot desired to be worked, without jumping around. With a solid star drill, and using water to flush the cuttings out of the hole, the hammer will drill rock to a depth of 30 inches.

The major advantage of this tool is that it is completely self-contained and does not require an air compressor, air hose and fittings, ignition battery, ignition coil and heavy cable, or any other source of power or accessory.

In principle, it consists of a 2-cycle gasoline engine in an inverted position—with two pistons, one an engine piston and one a hammer piston. The engine piston is connected to the crankshaft at the top of the hammer and drives the flywheel ignition magneto, and a fan for

Gasoline-powered breaker and drill.

forced air cooling. Starting is by a rope pull, the same as any outboard engine.

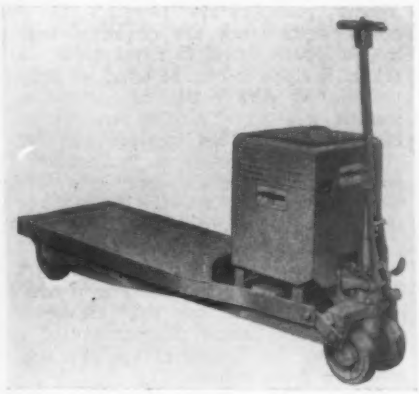
The free hammer piston acts as a movable cylinder head for the engine piston, and as the explosion occurs, is driven downward to strike directly on the shank of the tool being used, and then returned to the "up" or firing position, not by springs, but by low pressure exhaust gases.

Fuel (gasoline mixed with oil) consumption is relatively low—the hammer being equipped with a fuel tank having a capacity sufficient for several hours operation.

• Lift-Truck

A new type of lift truck for concrete-products plants is the PowerOx, developed by the Barrett-Cravens Company, Chicago.

This new unit combines the advantages of the hand-operated and power-operated lift-truck in this manner: With the PowerOx, loads are lifted by a series of vertical handle strokes. When the load is raised to the desired height, electric power is transmitted to the two rear



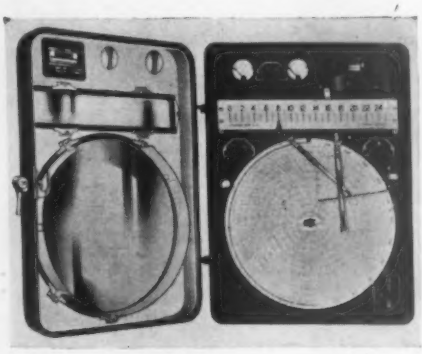
Combination hand- and power-operated lift-truck.

drive wheels by means of a simple "twist of the wrists"—one way to back up, the other way to move forward. There's no lost motion. Hands remain on handles to lift the load and to propel the truck.

The net weight of the PowerOx is considerably less than even the smallest electric trucks available. It, therefore, offers a new means of transportation. Previously, many plants could not use standard electric trucks because of physical conditions existing in their plants, or simply the lack of handling to warrant the large outlay in initial investment required by heavier trucks. Now these manufacturers can take advantage of the economies of electric lift-truck operation.

The electric drive mechanism of the PowerOx is derived from a low-cost storage battery capable of 8 to 12 hours continuous service—dependent on the type of application, weight of loads and distances travelled.

The PowerOx has a carrying capacity of 4,000 pounds and is available in widths of 19 and 25 inches, in platform lengths of 48 or 60 inches, and lowered heights of 7, 9 or 11 inches. There are two drive motors, one on each rear wheel.



The Bristol Company announces that it has redesigned its Pyromaster self-balancing potentiometer. The new Model 431 instrument has a universal wall or flush mounting case that is considerably deeper than the previous Model 440M, and has an internal hinged panel on which are mounted pen and indicator drive mechanism, and, in the case of electric controllers, the control contacts or proportioning slide wire, or in the case of air control, the complete new convertible-type air-operated control mechanism.

• Electron Microscope

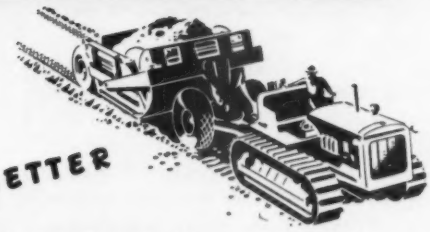
A new, desk-size electron microscope which will arm the nation's disease-fighters, food processors and industrial research men working in smaller laboratories with a powerful "super-eye" capable of probing deep into submicroscopic worlds, has been introduced by the Radio Corporation of America.

The new console instrument, fifty times more powerful than the ordinary optical miscroscope, makes possible useful magnifications of disease organisms, chemical compounds and other, minute particles of matter up to 100,000 times. Greatly simplified in design, and costing much less than its larger predecessor, the new instrument plugs into an ordinary electric socket. It is expected to find wide application in industrial laboratories, schools, hospitals, and particularly

QUICKER

LA PLANT-CHOATE
DOZERS - SCRAPERS
Handle a Variety of Quarry Jobs

CHEAPER



BETTER

For a good many years, successful pit and quarry operators have depended on LaPlant-Choate dozers and scrapers to handle a wide variety of jobs. Many plants use them regularly to feed crushers, load trucks and cars; they are kept busy stripping overburden and clearing sites for new operations; they build and maintain hauling roads . . . clean up around shovels . . . and "earn their keep" in many other profitable ways. Thanks to war-time improvements, tomorrow's LaPlant-Choate dozers and scrapers will do these jobs even faster, cheaper and better than ever. So plan now to replace and expand your present equipment with new LaPlant-Choate rigs—either cable or hydraulic operated. LaPlant-Choate Manufacturing Co., Inc., Cedar Rapids, Iowa.

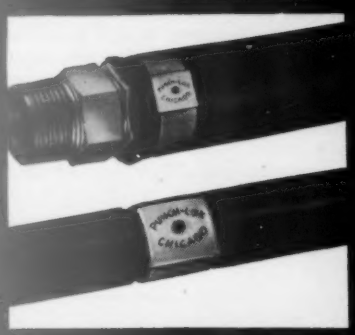
HOW TO MAKE PRESENT EQUIPMENT LAST

Due to the needs of our armed forces, new construction equipment undoubtedly will be difficult to obtain for some time to come. Therefore, it is good business to make your present equipment last as long as possible by: (1) Seeing that your machines receive proper care, plus regular inspection and maintenance; and (2) By utilizing the modern facilities of your LaPlant-Choate "Caterpillar" distributor to provide reliable parts and repair service.

ARMY (E) NAVY

LaPLANT-CHOATE
Earthmoving and Land Clearing Equipment

PUNCH-LOK
Streamlined
HOSE BANDING METHOD



SPEED-SAFETY-ECONOMY
In Clamping-Splicing-Repairing-Mending-Tieing-Reinforcing

PUNCH-LOK Streamlined Hose Banding Method is being used in hundreds of production and maintenance jobs in all industries for connecting high-pressure hose; splicing electric cable; stopping leaks in steam and water lines; reinforcing and mending splits in cross-arms and ladder rails; tieing rigid conduit or flexible cable to existing pipe lines or girders; tieing ends of wire or manila rope to prevent fraying—and many other jobs. PUNCH-LOK is giving wartime industries a fast, safe, economical, quality banding method. Investigate NOW the many advantages it will have for you in your present and postwar work. Let PUNCH-LOK solve your clamping or banding problems!

CLAMPS . . . Made of flat, high tensile, galvanized steel, double wrapped. Available from ⅜" to 48" I.D. Any large size clamp can be pulled down and made into a smaller size.

LOKING TOOL . . . Sturdily constructed to assure long life. Locks all size clamps with a tensional pull of 1,000 lbs. Hammer punches and breaks excess band flush at clip.

GROOVED FITTINGS . . . For water or steam lines. Permits application of high pressure clamping without damage to hose.

Write for Descriptive Catalog and Name of Local Distributor

PUNCH-LOK COMPANY

Dept. J, 321 N. Justine St.
Chicago 7, Illinois

Console electron microscope.

in factories for process and material control.

Tracing the development of the electron microscope and showing how RCA's television research into the fields of "electron optics" made possible many fundamental advances, Perry C. Smith, engineer in charge of the Electron Microscope Design Section of RCA, explained that the instrument is comprised of five main elements: (1) a vacuum pumping system, to create a vacuum in the specimen chamber; (2) an electrical system made up of several power supplied, (3) an electron optical system which forms the microscope proper (the electron microscope uses magnetic "lenses" in place of the glass lenses used in optical instruments); (4) a control system and (5) the housing.

The Universal microscope has been so simplified electrically that it now requires only 25 electron tubes, compared with 51 tubes in the original model. Control panels have been relocated for greater convenience. Direct magnification can be varied in forty steps from 100 times to 20,000 times. The resolving power of the instrument is so great however, that in order to reveal all the detailed information, pictures taken with the microscope can be enlarged photographically to more than 100,000 diameters.

The small console instrument which is expected to find wide application in smaller laboratories employs the same type of circuits and has the same tremendous resolving power and provides performance of the same order as its bigger brother. To reduce its cost, it has been streamlined, eliminating the diffraction camera unit, reducing the number of magnification stages and other design features. The console model requires but 15 tubes because of simplified electrical circuits.

• Conveyor System

The Morse Boulger Destructor Company of New York announces the purchase of all assets, patents, rights and other property of the Robinson Air-Activated Conveyor Systems owned hitherto by E. Gwynn Robinson, the inventor. Engineering and sales will be under the management of E. S. Bishop who has been identified with the bulk material handling business for many years.

The Robinson System, designed to handle fine or granular materials in bulk, has no continuously moving parts. Materials to be moved are fed into a conical tank or activator into which is introduced compressed air. The material is fluffed up and the lightened mixture of air and materials then flows through the pipe to designated destination. The cushioning effect of the air and the low velocities used minimize degradation of the particles and friction in the pipe. Operation may be manual, remote control or automatic. Installations have been made as long as 3600 feet with elevations of 600 feet, handling materials varying from about 40 mesh to 500 mesh and from 10 pounds to 100 pounds per cubic foot.

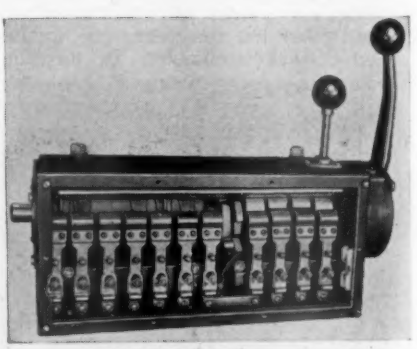
• Soil Waterproofer

Mud will no longer present a hazard in the construction of roads, airplane landing fields and other projects here and abroad. The Hercules Powder Company has announced the development of a chemical method of making soil waterproof. The compound is known as "Stabinol."

This announcement is good news to motorists because it means the end of muddy streets and roads. If properly used, Stabinol should be a great help, too, to the men who make the roads. Where mud delays progress in road construction work the chemical will be a time saver. And in rural areas where traffic is light it can be used to stabilize unsurfaced dirt roads or, mixed with soil, it will serve as the base on main highways with hard wearing surfaces.

Stabinol serves as a "raincoat" for roads. It is a resin compound which, when mixed with the top few inches of soil, makes a waterproof surface. Water cannot seep through the treated soil and turn it into mud. Rather, the water drains off or evaporates. The producers of the compound say that treated soil will not only resist penetration of surface water but also the capillary rise of moisture from below.

A rainstorm has no effect on a Stabinol-treated dirt road. Pedestrians need no longer jump for cover to keep from being mud-splattered by a passing truck of automobile. Trucks move along without churning up mud or digging ruts; and a car splashing through a "puddle" will kick up dry dust, not mud, behind it.



Improved economy in current consumption is indicated as the significant feature of the new M-79 simplified four-speed reversing controller for electric and gas-electric trucks manufactured by the Elwell-Parker Electric Company, Cleveland. Experience in operation under war conditions has shown that when motor current is restricted by introducing resistance on first, second and third speeds, a wasteful amount of current can be consumed by running the truck for protracted periods on any of these three speeds. The major portion of this possible waste of current is prevented by the M-79 Controller, which uses resistance on the first speed only.

This "soil stabilization" climaxes several years of laboratory and field tests with various resin compounds. The chemical company states that Stabinol does not increase the load-bearing capacity of soil but will preevnt soil from getting wet and thereby losing its strength. To "stabilize" soil only fractional amounts of Stabinol are required, usually about 1 per cent. of the total soil to be treated. Oddly enough, soil so treated looks just like the original dirt.

The treatment is by no means a temporary measure. The manufacturer states that soil stabilization will last for years. Evidence is given in roads which are still waterproof though they were laid down more than five years ago.

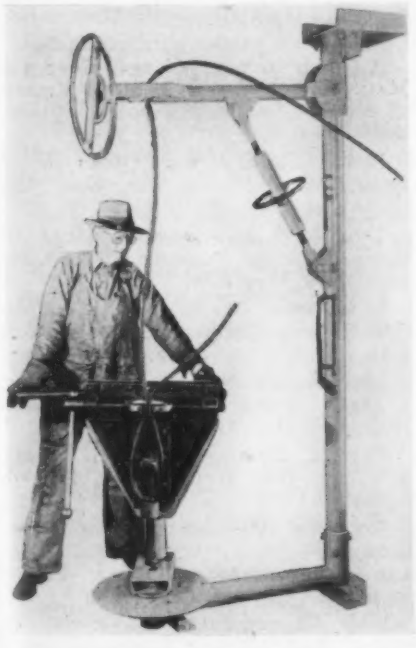
The company did not mention the location of military projects such as airplane landing fields but did state that resin-stabilized roads have been put down in various eastern states with the cooperation of city and state highway departments.

Stabilization work has not been confined to the United States, Panama and French Guiana are two of the territories where experimental work has been carried on.

In the company's soil laboratory in Wilmington, Delaware, there are many examples of the phenomenon of waterproof soil. Here complete soil studies are made. Test cylinders of stabilized soil which have been totally submerged in water for 90 days or more, still show no signs of softening into mud. By submerging these test cylinders the chemists are able to chart moisture absorption. Many stabilized soil cylinders, compacted to maximum density and only about two inches in diameter and not more than two inches high, will support the full weight of a man after having been totally submerged for long periods.

• Cable Splicer

Garlinghouse Brothers of Los Angeles, California, have recently announced the addition to their line of the new Gar-Bro cable splicing rig, a structurally self-contained unit designed to facilitate all the necessary operations in the splicing of cable.



The cable-splicing rig.

The stand is supported by a ball-bearing revolving base, and any standard splicing vise may be attached to it. A quick opening jaw-type vise, supported by a tension member, is located directly above the splicing vise. Any desired tension may be put on the cable between the two vises by vertical adjustment of the tension member through a double-acting screw provided with a hand wheel.

The machine may be used either as a portable or as a permanent installation, and has an over-all size, set up, of 96 inches by 45 inches.

• Motor-Generator

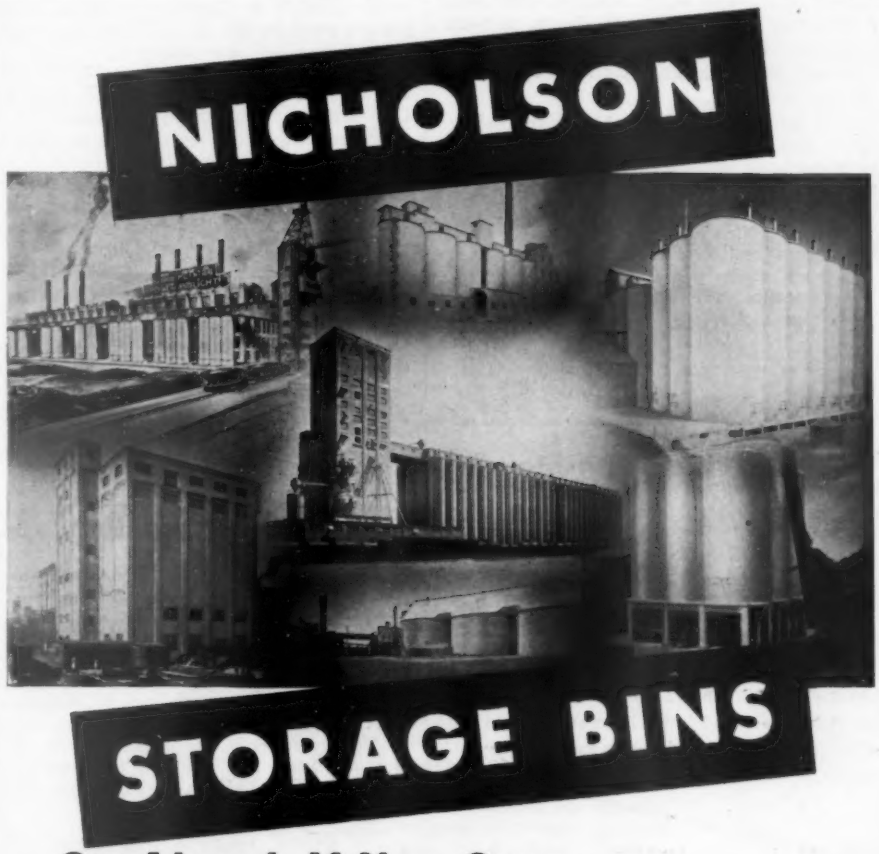
The Century Electric Company, St. Louis, announces a motor-generator set which will supply welding power for 15 to 30 men, all welding at the same time.

The motor is a 160-horsepower, 440-volt, 60-cycle 3-phase, 1160 r.p.m., squirrel-cage induction unit with drip-proof construction. This motor drives a 70-volt, 1500-ampere, flat-compounded, direct-current generator, rated one hour 50-degree temperature rise.

The machines are capable of being operated in parallel when large quantities of power are required.

TRADE NOTES

Sprout, Waldron & Company of Muncy, Pennsylvania, announce the addition of Dr. Thomas B. Dorris to the technical staff of the company as chief chemical engineer. Dr. Dorris is a graduate of the Engineering School of New York University and was granted



Go Ahead, If You Can Get Ready, Anyway!

How about that "streamlined" bin with all handling facilities for storing cement . . . or aggregate . . . or hydrate? Let Nicholson Engineers take you as far as you can go. To completion, if possible. Detailed plans, at least, so that when the green light clears the way for construction, no time will be lost.

In considering our services along these lines, bear in mind that Storage Bins and Tanks—many in your industry—together with all materials-handling facilities, have been our specialty since 1914.

BULK STORAGE · COAL-GRAIN-LIQUIDS STORAGE · HANDLING EQUIPMENT

THE NICHOLSON CO.

CONSTRUCTION · CEMENT-OIL-CHEMICALS

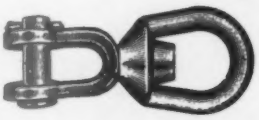
TEN ROCKFELLER PLAZA • NEW YORK 20, N. Y.

A prominent aviation manufacturer used a Laughlin Safety Hook, as shown, as part of a riveting machine set-up purposely devised for the safety and efficiency of women war workers.

This hook's unique, stout-springed safety latch holds its burden securely despite strain or jolts. That's why workers like it — it's safer.

This latch is available on all sizes and styles of Laughlin hoist hooks.

LAUGHLIN THIMBLES: Two styles . . . regular and plow steel pattern (extra heavy for use with plow steel and high tensile wire ropes).



LAUGHLIN SWIVELS: Made in the following types: jaw and jaw, chain swivel, swivel with jaw end, swivel with swivel. Drop-forged.

Write for catalog showing the complete line of Laughlin Wire Rope Fittings

Distributed through Mill, Mine and Oil Field Supply Houses

Look for Laughlin Products in PIT & QUARRY HANDBOOK

FORGING A SHARE IN VICTORY

THE THOMAS LAUGHLIN Company
PORTLAND 6, MAINE

his doctorate by the University of Notre Dame. He has served on the faculties of Manhattan College in New York City and the University of Notre Dame. Prior to accepting his present position, he was Technical Director of Research for the Franklin Research Company of Philadelphia, Pa.

The Sullivan Machinery Company, Michigan City, Indiana, announces the election of O. J. Neslage as vice-president in charge of sales in the United States and Mexico, and the election of J. A. Drain, Jr. to the position of vice-president in charge of product engineering, research and development. Mr. Drain was formerly assistant to the president, and prior to joining the Sullivan company was president of the Stefco Steel Company, Michigan City.

Seven more distributors, bringing the total number to date to fourteen, have been signed by R. G. LeTourneau, Inc., under its new sales policy.

The newest list includes R. E. Brooks Co. of New York City; Furnival-Rimmer Company in Philadelphia; Drave-Doyle Company at Pittsburgh; Costello Equipment Company at Calgary; Chicago Construction Equipment Company in Chicago; Parker-Danner Company at Hyde Park, Massachusetts; and Miller-Hasselbalch Company, of Omaha.

The LaPlant - Choate Manufacturing Company, Cedar Rapids, Iowa, announces the opening of a sales office in the International Building, Rockefeller Center, New York City. The new office will be in charge of Jay Fetters, formerly London manager of Caterpillar Tractor Company, and more recently on the staff of the chief of U. S. Army Engineers.

Anticipating a growing demand for repair and replacement parts as a result of war production burdens on equipment, a separate division for handling such business on all P&H products was recently established by the Harnischfeger Corporation, Milwaukee. The new Repair Sales Division is being managed by J. D. Glatz, recently returned from Washington after two years with the W.P.B. as chief of the crane and hoist section in the tools division. Prior to that, he was representative for P&H in the Chicago area.

The Bristol Company of Waterbury, Connecticut, manufacturer of industrial control instruments and mill supplies, recently received the first star for its Army-Navy "E" burgee, signifying renewal of the production award for the next six months.

The United States Rubber Company, has announced the appointment of Alexander S. Basil as assistant factory manager of the Lowell, Massachusetts plant. He has been with the company since 1926.

The Philadelphia district sales offices of the Explosives Department of the Atlas Powder Company are being moved to New York City. The new offices will be located in the Empire State Building.

Fairbanks, Morse & Company announces the opening of a new office in Tulsa under the management of Frank D. Ratcliffe. It is located at 1335 Hunt Building.

Trade Literature

The pieces of literature listed below can be obtained direct from the manufacturers named, or requests can be addressed to Pit and Quarry's "Service to Readers" Department.

ELASTIC STOP NUTS. 4 pages. Elastic Stop Nut Corporation of America, Union, New Jersey.

KOTAL BITUMINOUS MIXES. 8 pages. Kotal Company, New York City.

BRIGGS INTERLOCKING HOOK RENEWABLE TIP HAMMER FOR HAMMER MILLS. (Folder). William C. Briggs, Elkins Park, Pennsylvania.

SIMPLEX JACKS. 60 pages. Templeton, Kenly & Company, Chicago.

HOW THE G.E AMPLIDYNE IMPROVES ELECTRIC-SHOVEL OPERATION. 8 pages. General Electric Company, Schenectady, New York.

STORAGE MUST BE STREAMLINED. 32 pages. Nicholson Company, New York City.

ROBINSON AIR-ACTIVATED CONVEYOR SYSTEMS. 4 pages. Morse Boulger Destructor Company, New York City.

Z-METAL CHAIN BELTS. 4 pages. Chain Belt Company, Milwaukee.

SPIRALOK . . . A RIGID CASING FOR JOINING DYNAMITE CARTRIDGES. 16 pages. Hercules Powder Company, Wilmington, Delaware.

INDUSTRIAL WIRE ROPES HANDBOOK. 96 pages. Broderick & Bascom Rope Company, St. Louis.

WEDGE-SLOT SCREEN. 12 pages. Hendrick Manufacturing Company, Carbondale, Pennsylvania.

EAGLE IMPACT BREAKER AND PULVERIZER. 4 pages. EAGLE JAW CRUSHERS. 6 pages. Eagle Crusher Company, Inc., Galion, Ohio.

A GUIDE TO THE WARTIME CARE AND MAINTENANCE OF REX MOTO-MIXERS. 22 pages. Chain Belt Company, Milwaukee.

MACK TRUCKS FOR QUARRIES. 4 pages. Mack Trucks, Inc., New York City.

THE NO. 5 DIAMOND CORE DRILL. 4 pages. Chicago Pneumatic Tool Company, New York City.

LUBRICATING GREASES. 28 pages. Sinclair Refining Company, Inc., New York City.

JEFFREY ALL-PURPOSE CAR PULLERS. 4 pages. Jeffrey Manufacturing Company, Columbus, Ohio.

FORDAIR COMPRESSORS. 12 pages. Schramm, Inc., West Chester, Pennsylvania.

STEELCAR DEPENDABLE AIR DUMP CARS. 24 pages. SQUARE BOX DUMP AND QUARRY CARS. 12 pages. Pressed Steel Car Company, Pittsburgh.

BIRD CENTRIFUGAL CLASSIFIER. 6 pages. Bird Machine Company, South Walpole, Massachusetts.

National Gypsum Sees Big Post-War Sheathing Demand

Improvements to fireproof gypsum sheathing for which the National Gypsum Company anticipates a large market as soon as building restrictions are lifted, have been announced. The product's use in home construction after the war is expected to replace old style inflammable sheathing just as fireproof gypsum lath has displaced old style wood lath. The replacement of ordinary lath by gypsum lath is one of the outstanding developments in the building industry and the company believes a similar demand will grow for gypsum sheathing over the type now used.

"According to industry figures more than three-quarters of the old type lath market in 1939 was taken by gypsum lath. This rigid fireproof gypsum product made possible a better wall at no higher cost and its further growth can be expected in future use," the company reports.

"Because of its fireproof qualities and ease in application gypsum sheathing began to move into home construction before the war. Its actual use demonstrated many advantages over wood sheathing and the company believes that it will develop a wide demand during the next few years quite similar to the growth of gypsum lath.

"Recent improvements in manufacturing process and treatment for weather exposure now make the product ready for immediate installation on farm structures for the duration. The home, barn and other farm buildings badly in need of repairs get protection by nailing these large rigid gypsum panels over the outside walls. They add strength to the structure and the product can be had and applied at low cost. Then when lumber is available these panels may be covered with any type of siding and so converted into permanent fire protected structures.

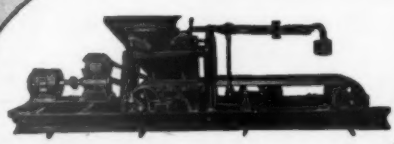
"Since gypsum is an incombustible mineral it provides effective fire protection for wood framing. Then, too, this product has many other outstanding qualities. It has been designed into strong panels of large uniform dimensions with tongue and groove edges for snug fitting, weather protected joints. Gypsum is inert, and these panels do not swell, shrink or warp because of changes in temperatures or weather conditions."

In Today's Spotlight

for speed and precision in

PROPORTIONING
WEIGHING
FEEDING

SCHAFFER
POIDOMETERS



Present emergencies demand peak production of raw and finished materials.
That is why the spotlight of interest is centered on SCHAFFER Poidometers —with their combination of large capacity, consistent accuracy, long service life and major operating economies.

Write for Catalog No. 5

SCHAFFER POIDOMETER CO.

2828 Smallman St.
Pittsburgh 22, Pa.

AMERICAN CRUSHERS work a 24-hour shift

AMERICAN PULVERIZER CO.

Write for Bulletin
1059 Macklind Ave., St. Louis 10, Mo.

V Sound the Alert!

MANAGEMENT
LABOR

—for the 5th War Loan drive during June and July. The need for the 5th War Loan is immediate, crucial. For impending events may make the 5th the supreme financial effort of the war.

The U. S. Treasury has set the overall goal at $16,000,000,000 — $6,000,000,000 from individuals alone. This is the biggest sum ever asked of the American people—*and it must be raised.*

That's why the U. S. Treasury asks Management and Labor to sit down together and organize—NOW!

For organization—good organization—has been responsible for the excellent showing of the payroll market. And its most important single superiority has been personal solicitation—desk to desk, bench to bench, machine to machine personal solicitation. 71% of all persons on payroll deductions were solicited for the 4th War Loan.

Now, to personal solicitation, add the sales incentive of a definitely established plant quota. Build your campaign around a quota plan. Set up departmental goals. Stress percentage of participation figures. Stimulate group enthusiasm.

In planning your quota campaign, work in close cooperation with the Chairman of your War Finance Committee. Everything is set to make the 5th War Loan drive a huge success—with your help!

(Note: You've read this message. If it doesn't apply to you please see that it reaches the *one* person who can put it in action!)

Here's the Quota Plan:

1. Plant quotas are to be established on the basis of an *average* $100 *cash* (not maturity value) purchase per employee.
2. Regular Payroll Savings deductions made during the drive accounting period will be credited toward the plant quota.
3. 90% of the employees are expected to contribute toward raising the cash quota by buying extra 5th War Loan Bonds: 1—Outright by cash. 2—By extra installment deductions. 3—By extra installment deductions plus cash.

Example: **JOHN DOE Mfg. Co.** — 1,000 Employees

1,000 employees x $100 Regular Payroll deductions during the eight weekly payroll Accounting Periods of June and July = $100,000 Cash Quota

30,000
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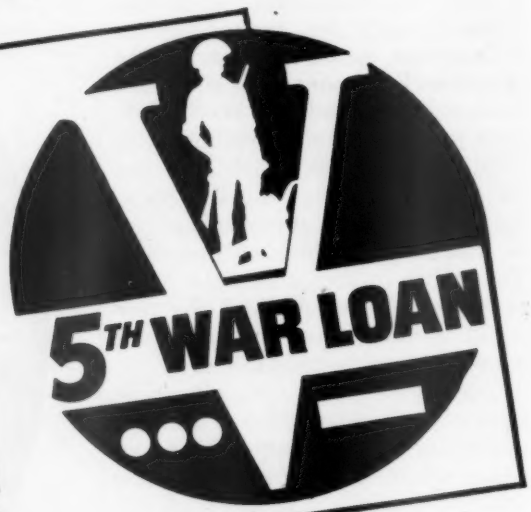

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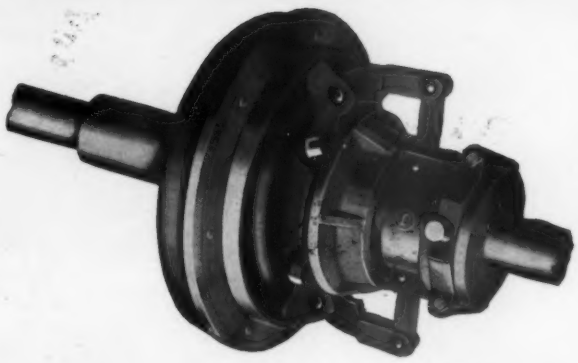

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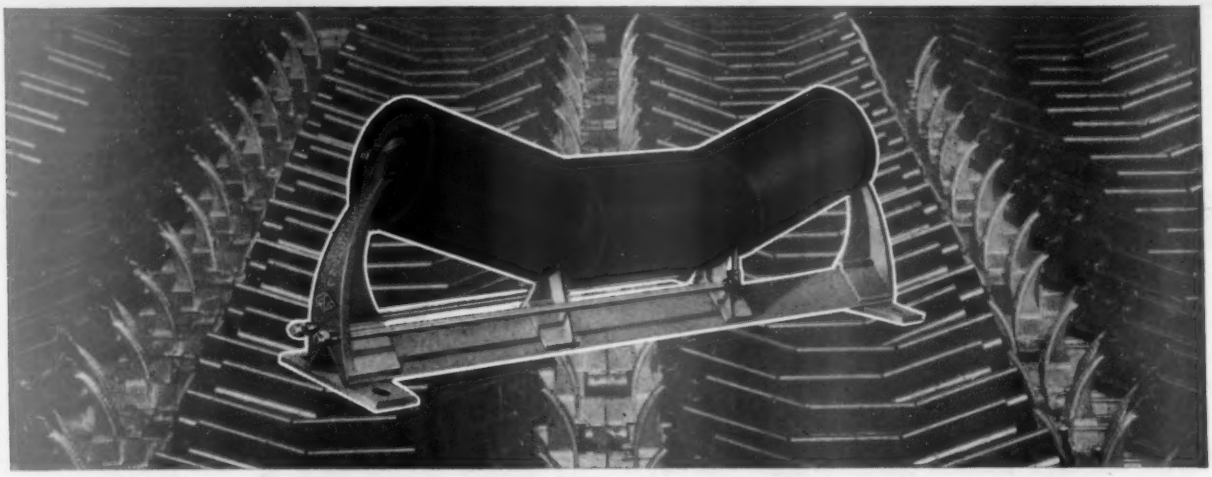

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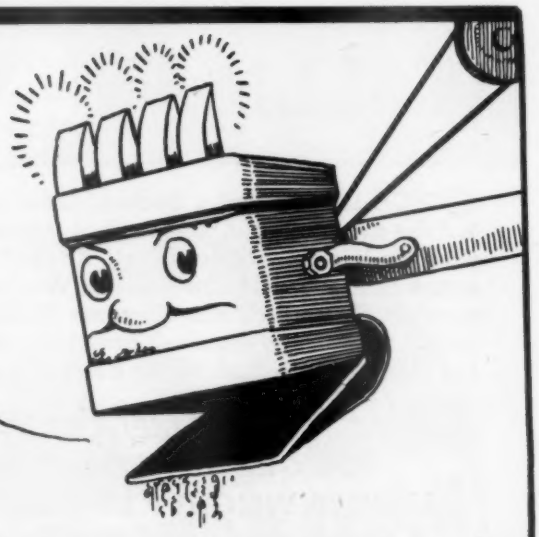

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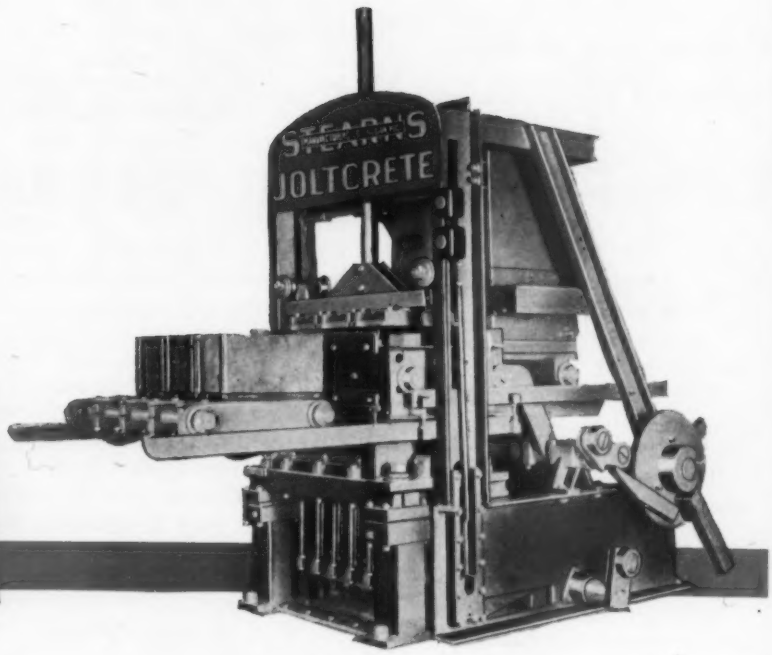

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JUNE, 1944

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Products Makers May Win Price Adjustment

Manufacturers of concrete cast shapes and cast stone and terrazzo who can qualify under "local shortages" provisions of the regulation establishing maximum prices for these building materials may now apply for individual price adjustment with their Regional Price Administrators, the Office of Price Administration has announced.

The action, effective April 29, 1944, adds those three types of products to a list including the following concrete products, to which the individual adjustment provisions already apply: building blocks and bricks, tile and tiling, sewer and culvert pipe, drain tile, posts, piles, and cribbing, septic tanks, grave vaults and liners, and laundry trays.

Completion of construction projects essential to the war program and the maintenance of a standard of living consistent with the prosecution of the war is dependent upon the use of cast shapes, cast stone and terrazzo products, the O.P.A. said. Investigation has revealed that local shortage conditions may frequently be encountered in the production and sale of the commodities.

The action provides that appropriate action may be taken by regional O.P.A. administrators upon individual application by producers in cases where:

(1) A shortage of supply of the commodities exists or threatens to exist;

(2) The shortages will be reduced or eliminated by adjusting the manufacturer's ceiling prices; and

(3) The adjustment will not create or tend to create a shortage or need for increase in price in another locality, and will effectuate the purposes of the Emergency Price Control Act of 1942, as amended.

Committee Reports on Steam-Pressure Curing

Committee 716 of the American Concrete Institute has been carrying on a study of high-pressure-steam curing. The committee is composed of Harold J. Levine, chairman; J. C. Chenery, M. W. Ferguson, Douglas E. Parsons, J. C. Pearson, Luther G. Randolph, Paul Woodworth, and J. Morley Zander.

In a progress report, published in the April, 1944 *Journal* of the Institute, the committee defines high-pressure-steam curing in terms of performance in reduced shrinkage of concrete products and arrives at the following conclusions:

1. Concrete-masonry products can be produced by high-pressure-steam curing methods ready for use within 24 hours after molding.

2. High-pressure-steam curing is completed without substantial change in shape or size or cracks.

3. High-pressure-steam cured units are substantially in a drier condition and lighter in color than moist-cured units, and give a clear ring when tested with a hammer.

4. Compressive strength of high-pressure-steam cured units at one day is at least equal to that of moist-cured units at 28 days.

5. High early strength of high-pressure-steam cured units is permanent.

6. High-pressure-steam curing treatment tends to stabilize unsound materials that might otherwise result in popping or spalling in service.

7. High-pressure-steam curing develops increased resistance to sulphate action.

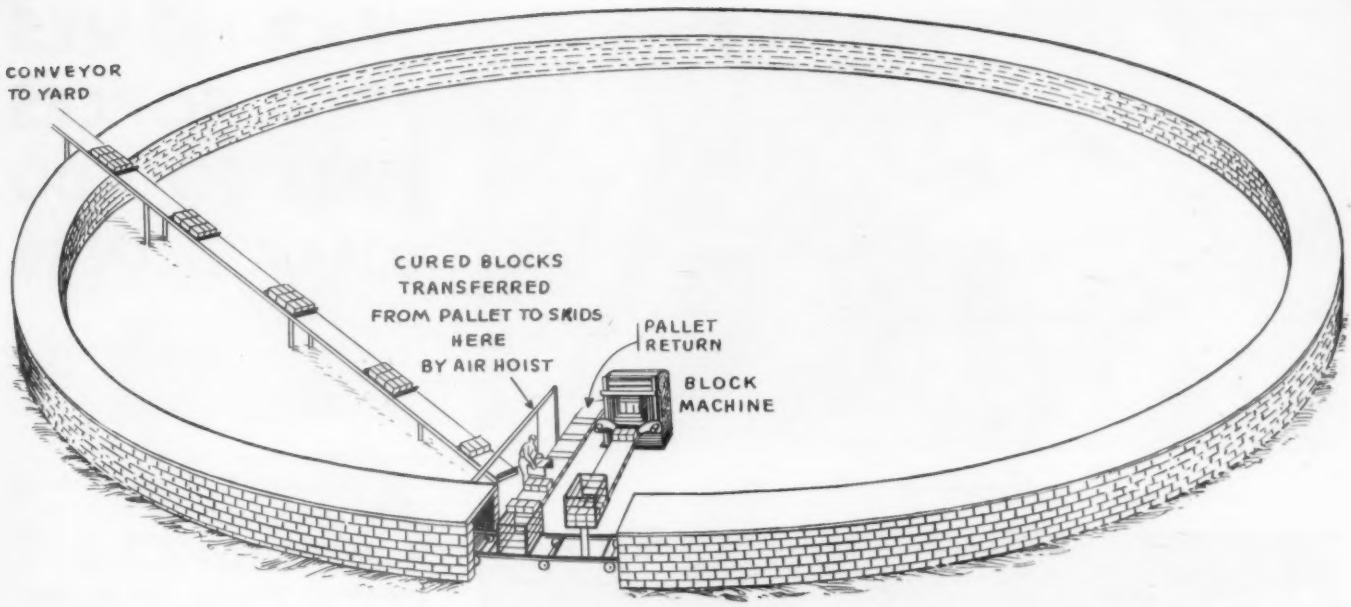
8. High-pressure-steam curing (especially in the presence of silica) practically eliminates leaching and efflorescence.

9. The shrinkage of high-pressure-steam cured units, in drying from a saturated condition to equilibrium with air in a heated building, is about 50 per cent. less than in moist-cured units.

10. The strength of high-pressure-steam cured units is influenced by the amount and character of siliceous material in the mix but in much less degree in lean and dry mixes than in rich and wet mixes.

11. High-pressure-steam curing results in lower bond stress between steel and concrete.

The Middle States Concrete Company, Ashland, Kentucky, capitalized at $80,000, has been chartered to manufacture and deal in all kinds of concrete by the secretary of state at Frankfort, Kentucky. Incorporators are Graham Webb, Eugene S. Burton and F. J. Balleston.



Artist's simplified sketch of the circular-tunnel curing kiln developed by Robert H. Gray of Sheffield, Alabama.

NOVEL "MERRY-GO-ROUND" CURING KILN DESIGNED BY ALABAMA PRODUCTS MAKER

By HARRY F. UTLEY

another P and Q exclusive

PICTURE if you can a circular "Merry-go-round" tunnel for curing concrete blocks about 475 feet in circumference and accommodating 160 racks, each loaded with 75 standard 8-inch units, the entire kiln covered with earth—and you have a rough idea of what Robert M. Gray, head of the Gray Concrete Products Company of Sheffield, Alabama, is planning to construct this summer.

The kiln will consist of concentric concrete block walls and monolithic concrete roof and floor, the rackloads of blocks moving on two fixed circles of steel revolving slowly on roller-bearing wheels very much as do the horses of the merry-go-round. With plenty of heat and moisture, the green blocks will be almost fully cured by the time they complete the circuit in the tunnel, estimated at about 20 hours. The entire operation will eliminate considerable labor and, while revolutionary in this industry, is simple in design and is almost certain to operate satisfactorily, in the opinion of several of the country's leading producers who have studied the blue-prints. Patents on the entire system have been applied for and the necessary equipment is to be fabricated in Birmingham.

In cross-section the huge, hollow concrete ring which forms the kiln will be about 8 feet wide and 6 feet high and 150 feet in diameter. Eighty sets of flanged wheels equipped with roller bearings will support the merry-go-round track and its 160 rackloads of blocks. The track is being made from inverted 60-pound railroad rails, one circle being 150 feet in diameter, the other 140 feet in diameter so that the rails are spaced 5 feet apart concentrically. The rails are to be tied with steel cross pieces at frequent intervals to form a rigid revolving structure.

Robert M. Gray, designer of the kiln.

The kiln will have but one opening, the break being slightly more than the width of two racks. Thus, as a rack of freshly molded units is loaded, a hydraulic ram will push it into the kiln, the entire 160-block load on the supporting rails being moved a distance of 34½ inches, exposing a rackload of cured units and bringing an empty rack which has just been unloaded into position for reloading with green blocks.

The racks, as designed, will accommodate five tiers of blocks and the loading is to be accomplished without lifting the blocks, a hydraulic lift of a type similar to that used in gasoline service stations to hoist an automobile for greasing being employed to raise the rack. This will allow the bottom tier to be filled first and, progressively, the second, third, fourth and fifth tiers, as the hoist is lowered to allow the units, on plain pallets, to pass into their respective supports in the rack.

A Besser Super Vibrapac will mold the units and, as they leave the machine, the palleted blocks will travel the 7-foot distance from the machine to the rack over a roller conveyor. Paralleling this roller conveyor will be another conveyor which will carry the cured units, on pallets, away from the rack being unloaded. Un-

(*Continued on page* 104)

WAR-HOMES NEED FORCES FIRM TO ADD 2 MACHINES

The block plant at St. Petersburg.

The 1-batch mixer with skip and concrete conveyor.

The three block machines with three-way concrete chute.

AN interesting example of the steady expansion of a business is furnished by the General Materials Company, St. Petersburg, Florida. This company was formed by J. E. Peterson, president, and H. E. Greer, secretary and treasurer, in 1938 to engage in the production of ready-mixed concrete. The company's fleet of trucks now includes 7 Concrete Transport truck-mixers. In 1939 a small sand plant was built near that city. These were both described in the July, 1940, issue of PIT AND QUARRY. When the building boom which preceded our entry into the war began to subside it was found that the ready-mixed-concrete business kept the plant crew busy only a part of the time. In order to provide them with full-time employment and to hold the crew together a concrete-block plant was built with a single Appley vibrating block machine. The growing demand for blocks in the Florida west-coast area for various war purposes soon made necessary the installation of a second machine and a third Appley machine was installed early in 1943.

Each of the three machines has a capacity of over 100 blocks per hour and the plant has been operating a single 55- to 60-hour week almost since it was built in order to supply the urgent demand. At no time has it been possible to build up a reserve storage of blocks. At present almost the entire output of the plant is going to a housing project for war-plant workers in Tampa. Of the 431,000 blocks and tiles required this company is supplying a large part of 244,000 standard 8- by 8- by 16-inch and 60,000 of 8- by 12- by 12-inch regular and 8- by 8- by 8-inch half-corner blocks. Other similar work has been done and a large quantity of 11½- by 11½- by 24-inch solid ship-ballast blocks has also been made by hand. While some special sizes of blocks are made

(*Continued on page* 102)

The plant building with concrete-walled ground-level storage at left.

New Products Plant at Orlando Reflects Ingenuity of Owner

OPERATED for the first time only a few weeks after Pearl Harbor, the new plant of the Kissam Builders' Supply Company, Orlando, Florida, found its stride in ample time to play an important role in the construction of several of the many large air-base stations that dot the Florida peninsula, including the Orlando air base, the Banana River naval air base, Fort Myers, and others. Among the interesting features of the plant is its exclusive use of a vibrating-core block machine invented and patented by the owner, Allen Kissam. This machine and an earlier plant operated by Mr. Kissam were described in these pages several years ago.[1]

All the materials are brought into this plant in railroad cars, from which the sand and the crushed stone are unloaded by crane into concrete-walled ground-level storage bins. The crushed stone is brought in from Brooksville, Florida, and the sand from Edgar, Florida, an average hauling distance of about 100 miles. Five sacks of cement, 20 cubic feet of crushed stone and 24 cubic feet of sand make up a batch, to which approximately 5 gallons of water is added per sack of cement. The water is measured through a Neptune meter. The materials are wheeled to a skip hoist designed by Mr. Kissam, which elevates the batch and dumps it into the 1½-cubic-yard Concrete Transport mixer. The mixer is mounted on wheels and travels laterally on rails above the block machines.

The skip hoist, the operation of the mixer, and its lateral travel to discharge over any one of the six block machines are all controlled by push-buttons located at ground-floor level. Limit switches accurately spot the mixer at the desired position, where it dumps into a steel hopper-chute which discharges to an open-ended, rectangular trough that rests on the block machine. The mix is raked from the trough into the block machine by hand.

The Kissam block machine has a vibrating core surrounded by a vertical stripping member in a stationary mold box. Vibration for 10 seconds compacts the block. Pushing back the hopper automatically cuts off the vibration and trowels off the top of the block. A short-throw hand lever ejects the block by raising the pallet to the top of the mold box. The blocks are loaded on racks and hauled by Barrett-Cravens jack-lift trucks to the curing room.

The vibrating-core block machine operates best when very wet concrete is used. This is possible because the rapid vibration of the core creates enough suction to draw out some of the excess water. The 6 vibrating core machines now in use have a combined capacity of 6,000 blocks per 8-hour day, using a 15-man crew. Of this number 6 men operate the block machines, 2 men handle the aggregates and run the mixer, 2 men pull out, and the remainder stack.

The blocks remain overnight in the curing room where they are sprayed continuously. Whenever it is possible they are kept in the storage yard for 28 days before being shipped; all the blocks in the yard are sprayed for 7 days. The 125- by 200-foot concrete-paved yard will accommodate 225,000 8- by 8- by 16-inch blocks and is completely flood-lighted for 3-shift 24-hour operation when necessary.

Ten Mack trucks, ranging from 6 to 12 tons in capacity, are used for making deliveries, and in addition some shipments are made by railroad to points in South Carolina.

When steel becomes available

[1][See Trauffer (W. E.). *Florida Products Maker Enjoys Best Year Since Collapse of Boom*, PIT AND QUARRY, October, 1940, page 71. —ED.]

View showing mixer and block machine set-up.

Pressing mix through hopper into mold-box of block machine.

Removing a unit. Hand-lever ejects block from mold-box.

Mixer tilting and discharging into chute above one of the block machines.

again for general use Mr. Kissam plans to make a number of changes and improvements in his present plant. The existing steel columns will be strengthened and storage bins and batchers will be installed above the mixer, with a bucket-elevator to lift materials to the bins. The plant will then use bulk cement brought

Skip-hoist in receiving position at ground level. Control panel and water meter are at left.

in in special cars and handled through a Fuller-Kinyon pump. Although the plant has a steam-curing room that is complete except for the boilers, it has been found that the use of high-early-strength cement through the winter accomplishes about the same results, and it is accordingly doubtful if steam curing will ever be adopted. The present jack-lift trucks will be replaced by power trucks as soon as they become available.

Mr. Kissam also operates the older plant of which the principal output is now limited to special blocks. This plant uses 8 of his vibrating-core machines, and it has a capacity of about 5,000 blocks per 8-hour day. This is the plant described in the October, 1940, issue of PIT AND QUARRY.

The Kissam plant, representing as it does so much of the personal ingenuity and inventiveness of its owner, seems to refute the argument that American individualism is in the doldrums. There has been an understandable tendency to overlook the war-time performance of non-war industries in favor of the more dramatic achievements in the production of military supplies, although in many instances producers of civilian goods have surmounted the same obstacles without the advantage of preferred claims against available man-power, equipment and materials. Their contribution to the war effort will probably never make front-page news, but doubters may find in it convincing evidence that the fibre of American individualism is still tough.

General *(from page 100)*

the 8- by 8- by 16-inch unit is standard and the usual range is from 4- by 8- by 16-inch to 8- by 12- by 16-inch units.

It is expected that private building construction will keep the plant busy as soon as restrictions on this type of work are eased. In anticipation of this rush of construction many prospective home owners are pouring concrete basement walls or laying the block foundations now for future houses.

The concrete and block plants are both located at the company's yard, 601 24th Street South, in the heart of St. Petersburg. Most of the sand for both plants is received from the company's sand plant and the crushed limestone comes from the Brooksville area 50 miles northeast of the city. Both are unloaded from railroad gondola cars by a ⅜-cubic yard Bucyrus-Erie clamshell crane into the concrete-plant bins and to piles at the block plant.

The coarse aggregates used in the blocks are chats, or ¼-inch crushed limestone, Florida state specification Number 16. The sand is well graded. From 21 to 22 blocks are obtained from a 1-sack batch. At 28 days the blocks average over 1,100 pounds per square inch compressive strength. This compares to the Underwriters' minimum of 700 pounds and the city building code's 800-pound requirement.

The aggregates at the block plant are shoveled from the piles into wheelbarrows which are weighed on a Fairbanks platform scale before the aggregates are dumped into the skip of the 1-sack Koehring concrete mixer. The concrete is discharged from the mixer on a short, inclined belt-conveyor. This in turn discharges the concrete to a 3-way chute which feeds the three Appley Owens "Little Giant" block machines. Each operator hoes his own concrete down into the machine and handles the finished blocks to the wooden racks.

These block machines are original in design and have been described in these pages (*P&Q*, March, 1944, p. 141). A feature of this machine is that it has a vibrating mold box and stationary cores. It is 1-man-operated and can make 1 block every 30 seconds.

The loaded wooden racks are hauled away by Barrett-Cravens lift trucks. After 3 days' curing under roof the blocks are hauled to the yard and piled. During most of the year they are wetted down for about 7 days after they are made.

Discuss Disposal of Surplus Equipment

How Canada and the United States agree and differ in procedure relating to the disposal of surplus construction equipment at war's end was told by C. F. Winchester, executive secretary of the Associated Equipment Distributors who spoke before the first annual meeting of the Associated Equipment Distributors of Canada recently. The meeting was held in Montebello, Canada. James F. Crothers of George W. Crothers, Ltd., Toronto, president of the Canadian group, presided.

"The Executive Committee of A.E.D. having approved of a resolution on disposal of surplus equipment prepared at the annual A.E.D. meeting, this has been delivered to congressional leaders and to other associations interested in the topic," Mr. Winchester said. "This will be a major problem in the states when the war ends, in fact we are confronted with this problem right now.

"I understand that in the Dominion of Canada there is a Crown corporation set up to handle this matter, while in the United States we have a Surplus War Property Administration.

"William L. Clayton, Surplus War Property Administrator in the U. S., has seen our resolution and says he sees no serious objection to it, except that there will be times when such equipment will have to be sold by a negotiated sale and there will be other times when it would be disposed of through other than established trade channels, although he emphasized that he favored use of regular trade channels."

Mr. Winchester also spoke of the importance of the rehabilitation of former employes of the construction equipment industry who now are in the armed forces. He said they would bring back a "wealth of knowledge" from their service and their knowledge of how such equipment functioned.

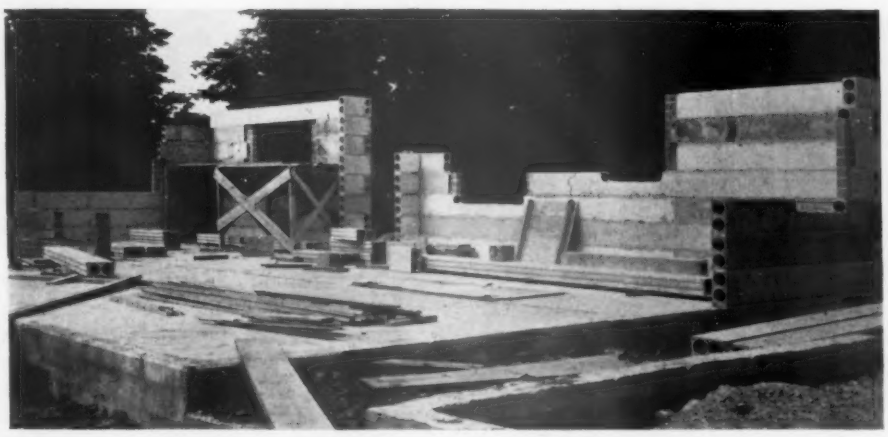
ROOF SLABS INVADE SIDE-WALL FIELD

WITH their position firmly established in the realm of floor and roof construction, Flexicore precast concrete slabs are now invading the side-wall construction domain in what appears to be a most promising bid for position in the post-war home-building sweepstakes. Two Flexicore side-wall jobs (one a 5-room residence with attached garage and the other a factory-type wall) have been in service for about two years, and are reported to be in excellent condition despite the fact that their exterior surfaces have received no treatment or coating of any description.

The owner of the 5-room house had already decided upon the use of Flexicore slab units for the floors, and was strongly prejudiced in favor of fireproof wall construction throughout, though somewhat hesitant in selecting any of the usual masonry materials for this purpose. Somewhere in the course of the ensuing discussion the first Flexicore house was conceived.

Five-room house with breezeway and attached garage. Roof slabs were used in the walls and floors.

Since the longest Flexicore slabs manufactured are 22 feet 6 inches, in the side-wall construction it was necessary to locate several vertical joints between units. To avoid any possibility of having planes of weakness in the walls, these joints are staggered, as may be seen by close inspection of the illustrations. The application of Portland-cement paint would undoubtedly conceal them altogether.



Slab side-wall house in various stages of construction.

Setting the slabs in mortar to form the side walls.

The erection of the walls was accomplished with a small truck-mounted hoist and a special clamp similar in operation to a pair of ice tongs. Except for small tools, such as hammers, chisels, levels and mauls, this was the only equipment required. So as not to draw moisture from the mortar, the laying side of each slab unit was thoroughly soaked with water before erection. This was particularly important since Flexicore slabs are run through kilns for controlled curing and are very dry. Half-inch mortar joints are used between the slabs, and these are later struck with a round-edged tool.

The floor slabs are recessed in the foundation in order to allow the side-wall construction to proceed directly from floor level. At the corners slabs are interlocked in the same manner as in log construction, with wood trim used to conceal the exposed ends. Various other corner treatments have been studied.

To aid in setting the steel sash and at the same time to introduce variety in the design concrete bricks are used around the windows. Here again the joints are staggered to gain strength.

The interior finish consists of plaster on plaster board which is secured to 1⅝- by 2-inch furring strips. This method of construction provides an additional dead air space as insurance against cold interior walls and condensation

troubles. The upstairs floor is also built of Flexicore slabs, so that the only wood used in the entire house is in the partitions, the trim and the pitched roof. The latter construction was necessary in order to conform with the appearance of neighboring houses. The floor finish consists of asphalt tile cemented directly to the precast slabs, and the ceilings were finished by applying paint to the undersides of the slabs.

As the accompanying views suggest, Flexicore units for side-walls offer interesting possibilities for architectural effects not readily obtainable with other types of precast masonry units. Obviously no satisfactory conclusions may be reached from the meager cost data now available, nor is it likely that further development will be possible before the end of the war. Price Brothers Company, owners of the Flexicore patents, have only this to say: "We have had many favorable comments on this house and feel it is worthy of further study."

View showing corner trim and treatment at windows

Merry-go-Round *(from page 99)*

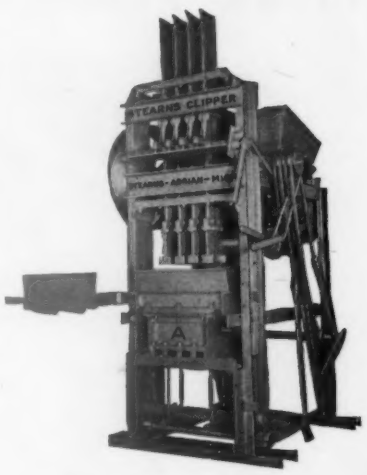
loading will be done in a manner similar to loading, another hoist raising and lowering the rack to allow the cured units to roll out onto the conveyor without lifting. A special air hoist will be used to remove the cured units from the pallets and the pallets will continue on to the rear of the Vibrapac for re-use. At one point along this conveyor, a revolving brush will clean the pallets and spray jets will oil them.

As the air-hoist operator lifts the cured units from the steel pallets, he will place them on large wooden skids about 42 by 52 inches in size carried by another conveyor which will transport them to open storage where the delivery trucks will be loaded. Piping in the circular kiln will be arranged close to the floor between the wheels on which the rails rotate. These pipes will supply heat and release steam for moisture needed in the curing process. Baffles between every three or four racks will pocket the heat and steam, allowing little to escape at the point of loading and unloading.

Some of the 42- by 52-inch wooden skids to be used with the new kiln system.

Only two men will be needed to handle the operations, Mr. Gray points out, one at the block machine and racks, and one at the air hoist where the cured units are transferred from the pallets to the skids.

The present plant of the Gray Concrete Products Company at Sheffield is of conventional design and went into operation in January, 1941. Both cinder and Superock units are produced. The new plant and circular kiln will be erected on a site still to be chosen in the Muscle Shoals area.



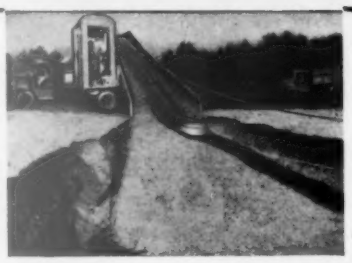
The Clipper Stripper, shown above, available in 5 models, is only one of the popular machines in the ANCHOR Line of Complete Equipment for the Concrete Products Plant. ANCHOR Engineering Service in the design of new plants or revamping older operations is nationally famous. Consult us before you buy equipment or modernize your plant . . . it costs no more.

Hobbs block machines, Anchor tampers, Anchor, Jr. strippers, Stearns power strippers and Jolterete, Stearns mixers and pallets, Straublox oscillating attachments, etc. Repair parts for: Anchor, Ideal, Universal, Stearns, Blystone mixers and many others.

ANCHOR CONCRETE MACHINERY CO.

G. M. Friel, Manager Columbus, Ohio

LOWER COSTS FOR DIGGING and CONVEYING



Small Sauerman Scraper Loads 700 Tons of Pit-Run a Day

WHERE materials such as sand, gravel, blasted rock, etc. must be dug, hauled, and dumped at ranges from 100 to 1000 ft. or more, the economical way to do it is with a Sauerman Scraper or Cableway.

First cost of a Sauerman machine is reasonable, upkeep is low, and the simplicity of operation permits easy one-man control of even the largest installation.

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534 S. Clinton St., Chicago 7, Illinois

ERIE TRUCK MIXER PLANTS

Erie builds a complete line of central concrete plants to keep truck mixers on the move.

Consult Erie now for the most modern of Post-war Plants.

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AggreMeters · Buckets · Concrete Plants · Traveling Cranes

Urges Widespread Adoption of New Masonry Code

Building code officials in 2,000 communities are being urged by the Producers Council to adopt standard code requirements for masonry as a means of lowering the cost of building and improving the quality of masonry construction, according to an announcement by James W. Follin, managing director of the council.

Nation-wide adoption of the masonry code, which was sponsored by the National Bureau of Standards and approved by the American Standards Association, is strongly recommended by four national trade associations directly interested in the production of masonry materials—the Structural Clay Products Institute, the National Concrete Masonry Association, the Portland Cement Association, and the National Lime Association. The types of masonry products covered by the standards include brick and tile, cement blocks, gypsum blocks and reinforced concrete.

"Although some local building codes already provide for most of the standard provisions incorporated in the masonry requirements, adoption of the proposal will permit important savings in many cities," Mr. Follin states.

"For example, foundation thickness in residential buildings not over two stories in height is reduced from 12 to 8 inches, while still allowing ample safety in construction, in the opinion of the A. S. A. sectional committee which adopted the standards. In the case of two-story residences, 8-inch wall construction is approved for both stories, as compared with 12 inches now required for the first story in many codes.

"For one-story buildings a 6-inch wall is now approved in place of the 8-inch thickness, stipulated in many local codes. Cavity walls, in which a 2-inch air space is left between two tiers of bricks tied together with metal ties, are permitted in the interest of better waterproofing. Better also is assured by improved standards for mortar."

In a letter to building code officials, transmitting copies of the standards, the council pointed out that the use of this and other existing standard provisions in building codes will give encouragement to the preparation and adoption of still other standards, thus steadily improving the quality of construction.

Mr. Follin explained that the council and its members are actively interested in the improvement of building codes as a means of providing safe, durable and economical buildings and structures, as expressed in the organization's platform for postwar construction, which recommended that:

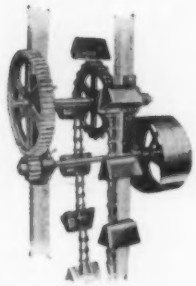
"Building codes should be revised by the incorporation of standard code provisions, prepared through accepted industry processes, thereby bringing building codes to a desirable degree of regional uniformity."

Study Permeability of Concrete to Kerosene

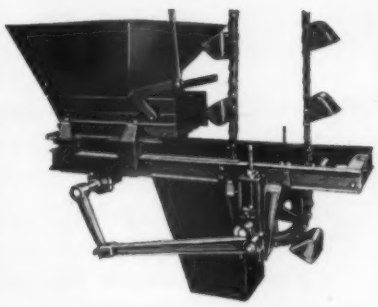
The increased wartime use of concrete tanks for storing Diesel oils, light fuel oils, and gasoline induced the Bureau of Mines to undertake a limited investigation of methods for rendering concrete adequately impermeable to these products. Measurements were made by F. B. Hornibrook of the Bureau of the daily inflow of kerosene under a 12-foot pressure head into one face of specially treated concrete disks.

The penetration of kerosene into 4-day-old untreated concrete was relatively low but after the concrete dried for 6 weeks the penetration was high. The use of integral admixtures and of lacquered instead of oiled forms reduced the penetration, but not enough to be economically adequate. Sodium silicate or magnesium fluosilicate applications were not significantly effective; but plain, well-troweled plaster coat of cement-sand mortar reduced the rate of penetration of the kerosene to low value. Whether the development of shrinkage cracks on a large surface treated in this manner would nullify these results remains a question. Powdered iron-type admixtures in the mortar coat reduced oil penetration, and one magnesium oxychloride type of coating looked promising if used where exposure to drying or to water is not excessive. This type of coating has the advantages of low cost and easy application. Spar varnish was effective in reducing penetration but would require long time tests to indicate its permanence to such exposures. Polyvinyl chloride type paints and polysulfide emulsified latex linings were effective and are reasonably stable to water, oils, and gasoline. However, these materials are expensive and the cost of applying them is high, so that their use is warranted only under special conditions.

AGGREGATE ELEVATORS



Kent Top Drive



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With THIS

COMMERCIAL Cored Steel Pallet

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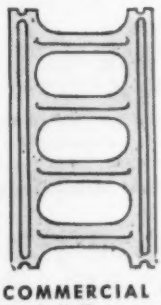
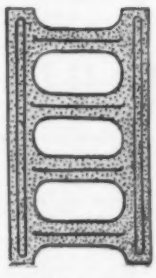


Make THIS



COMMERCIAL Cored Steel Pallets are easily handled, do not warp, break or crack, and insure perfectly cured and shaped block.

Maximum product range and minimum machine expense are assured.

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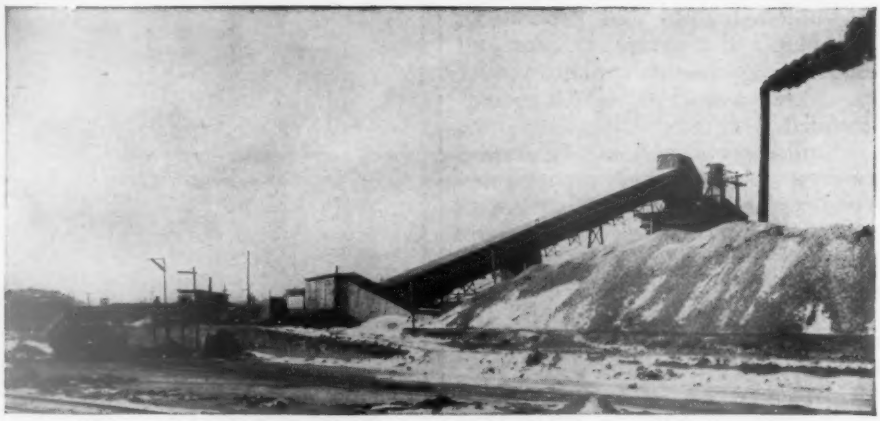
THE COMMERCIAL SHEARING AND STAMPING CO.
Youngstown, Ohio

The CONCRETE MANUFACTURER

NEARLY NEW CONCRETE BATCHING PLANT



Capacity 250-350 Cu. Yd. Per Hour . . . Available for Immediate Delivery.

Complete Butler concrete plant. Excellent condition, used only 7 months. Adaptable for either commercial or construction use where high rate of concrete pour may be required. Equipped for manual, semi-automatic or automatic operational control. See details below.

BATCHING BIN. Bin—250 yd. capacity—190 yd. 3-compartment aggregate 400 bbl. cement.

2 BUTLER CEMENT STORAGE BINS. 2,000 bbl. capacity, 2-compartment, 3,000 bbl. capacity, single compartment. All bins equipped with air jets and steam jets.

BATCHERS. 1 Butler aggregate 5 yd. capacity, complete with beam-type scale, manual operation.

1 Butler cement 3,000 lb. capacity, complete with beam-type scale, manual or automatic operation.

1 Butler water batcher 200 gals. capacity, beam-type scale, complete with 400 gal. surge tank and valves, manual or automatic operation.

ELEVATOR & TRACK SCREW. 300 bbl. per hour capacity, screw 37 ft. long, equipped for either box car or hopper car cement delivery. Complete with 20 hp. electric motor.

CONVEYORS. 1 Barber Greene 36" inclined conveyor 224'6" long, equipped with: 50 hp. Century motor; one 40 yd. track hopper; one 20 yd. track hopper; one 20 yd. truck hopper. All necessary A frames, trusses and supports included. All hoppers equipped with discharge gates.

1 Barber Greene 36" horizontal conveyor 129'6" long. Complete with 18 double clam-type fill valves, 20 hp. Century electric motor complete with trusses.

1 Barber Greene 36" inclined conveyor 60'6" long. Complete with 15 hp. electric motor, trusses and supports.

These conveyors were used only 6 months under cover. They are in excellent condition and include band type brake, pivoted distributor, ground level control and Alemite one-side system of lubrication. We have an extra 500 feet of brand new pre-war belting available with this plant or conveyor system.

MISCELLANEOUS. Collecting hopper under batcher, 5 feet cement screw feeder complete with motor for automatic control of cement. Traveling hopper for charging batch trucks. Extra cement buckets, drive chain, elevator chain for cement elevator and track screw, etc.

WE WILL CONSIDER THE SALE OF THIS EQUIPMENT IN UNIT SECTIONS AS FOLLOWS:

1. Concrete plant complete, including cement elevator, conveyor system, and one cement storage bin.
2. Concrete plant alone without cement storage bin or conveyor system.
3. Conveyor system alone.
4. Either or both cement storage bins with or without cement elevator and track screw feeder.

Also 13 Late Model Transit Mixers

8—1942 Model Jaegers — High discharge, separate engine drive with two speed transmission: 4 mounted on 1942 Dodge trucks; 6 wheel tandem drive—all in excellent condition with good tires.

5—1942 Model Smith, all high discharge type with separate engine drive. Mounted as follows: 2—3½ yd. capacity on Mack trucks. 2—3½ yd. capacity on Autocar trucks. 1—4 yd. capacity on White truck.

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HOW TO MAKE YOUR MEDIUM TRUCK EARN MORE MONEY

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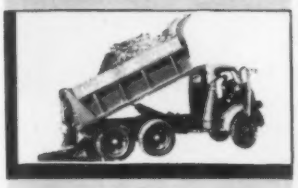

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GENERAL HAULING

This is the Thornton Drive, consisting of two driving axles; two-speed gear case assembly; "walking beam" type springs; wheels; tires.

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DUMP TRUCK WORK

ADD THE THORNTON *FOUR REAR WHEEL* DRIVE! CONVERT IT INTO A HEAVY DUTY TRUCK

Whether you own, or expect to buy, a medium truck, you both save and make more money when Thornton properly engineers and installs this 2-drive axle BOGIE, thus converting a 1½-2 ton medium truck into a powerful, 6-wheel heavy duty truck, capable of delivering 100% *more* rim-pull which permits hauling 100% *more* payload through sand, mud, muck, snow, over ice and up steeper grades.

- Make your converted truck do double duty . . . haul twice as much . . . earn more money.
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You SAVE *on*

√Investment, operation, upkeep.

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Please send me catalog of facts on changing my 1½-2 ton truck into a heavy duty truck.

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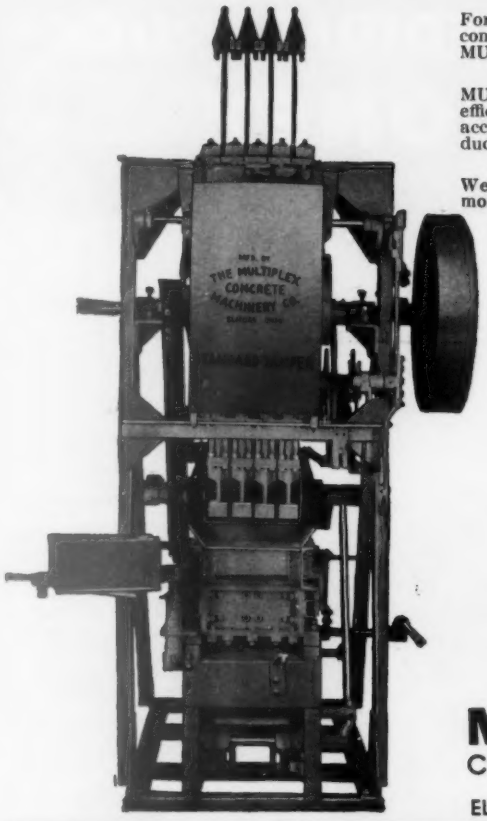
MULTIPLEX Machines For Postwar Profits



For a Quick "Take-Off" and sustained pace in concrete block output, reserve one of the MULTIPLEX *high-speed* machines.

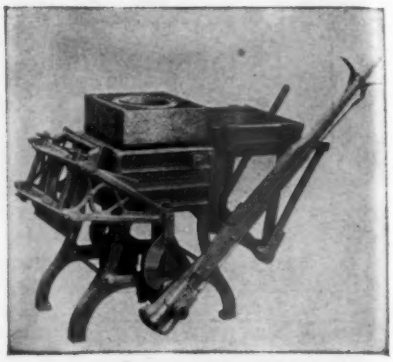
MULTIPLEX offers a wide variety of super-efficient mixing equipment, with all types of accessories necessary for economical mass production.

We can recommend MULTIPLEX units for modernizing *your* plant and enlarging its capacity.

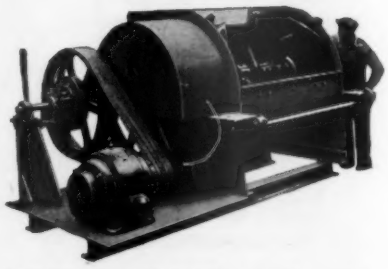
Our universal type MULTIPLEX Standard Tamper for making plain and stripper, or face blocks, on one base. Easily convertible as business expands. Supplied with 4-bar or 8-bar tamper, either power or hand operated.

Write for Booklet describing the MULTIPLEX complete line of concrete mixing equipment, including Double and Single Hand Press Strippers, Power Press Strippers, and Super-Tampers.

MULTIPLEX
CONCRETE MACHINERY CO.
Frank Muenzer, President
ELMORE • OHIO



The MULTIPLEX Flue Block Machine makes ventilated, solid or lightweight units, including all attachments for ventilator and stove pipe openings.



MULTIPLEX Multi-Mixer with reverse screw-type action insures fast and thorough mixing of every batch. Side, end or bottom discharge.

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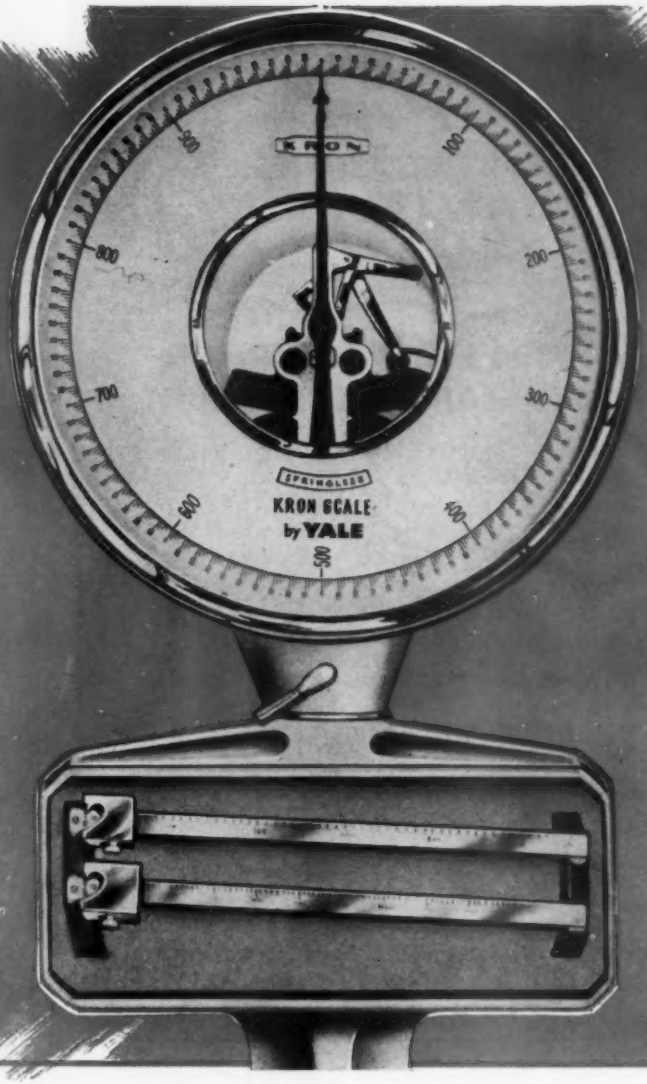

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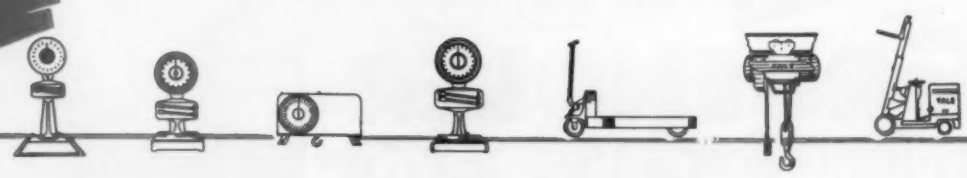

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Operating 26 plants ourselves and making concrete pipe in all of them, we know what constitutes your best equipment. Ask us about our "all-purpose" machine which produces concrete pipe in every size from 6" to 48". We can also outfit you for making larger sizes — up to the 135" pipe we have made for highway work.

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BARRETT LIFT-TRUCKS

ONE MAN HANDLES 48 BLOCKS NO BREAKAGE

Handle your green concrete products the way that more than 800 other concrete products plants do, WITH BARRETT LIFT-TRUCKS EQUIPPED WITH A SUPER-SPRING FRAME AND RUBBER TIRES. Eliminate breakage — joggling out of shape and spoilage. Save time, money and labor by eliminating all unnecessary handling and breakage. Take your blocks direct from the machine to the curing room—with ease and dispatch. One man handles 48 blocks of the 8x8x16 size—or, 32 blocks of the 8x12x16 size.

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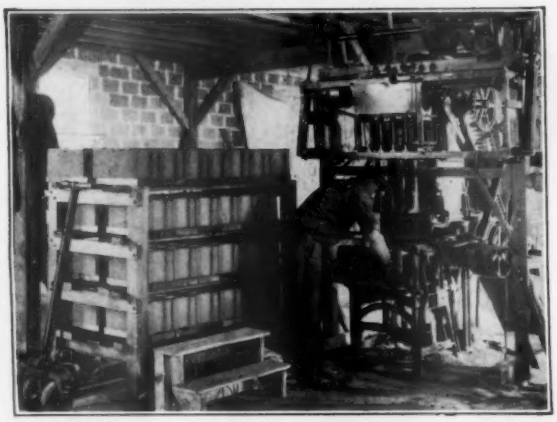

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When the war is over, road, street and building programs of immense proportions will start. That means sand and gravel in tremendous amounts. Very likely your present plant would be swamped by such a rush demand.

Why not get ready now to handle it in stride? Step up your facilities, including installation of bins to save labor, speed loading.

Any size bin. Any type elevator. Neff & Fry catalog tells all. Get your copy.

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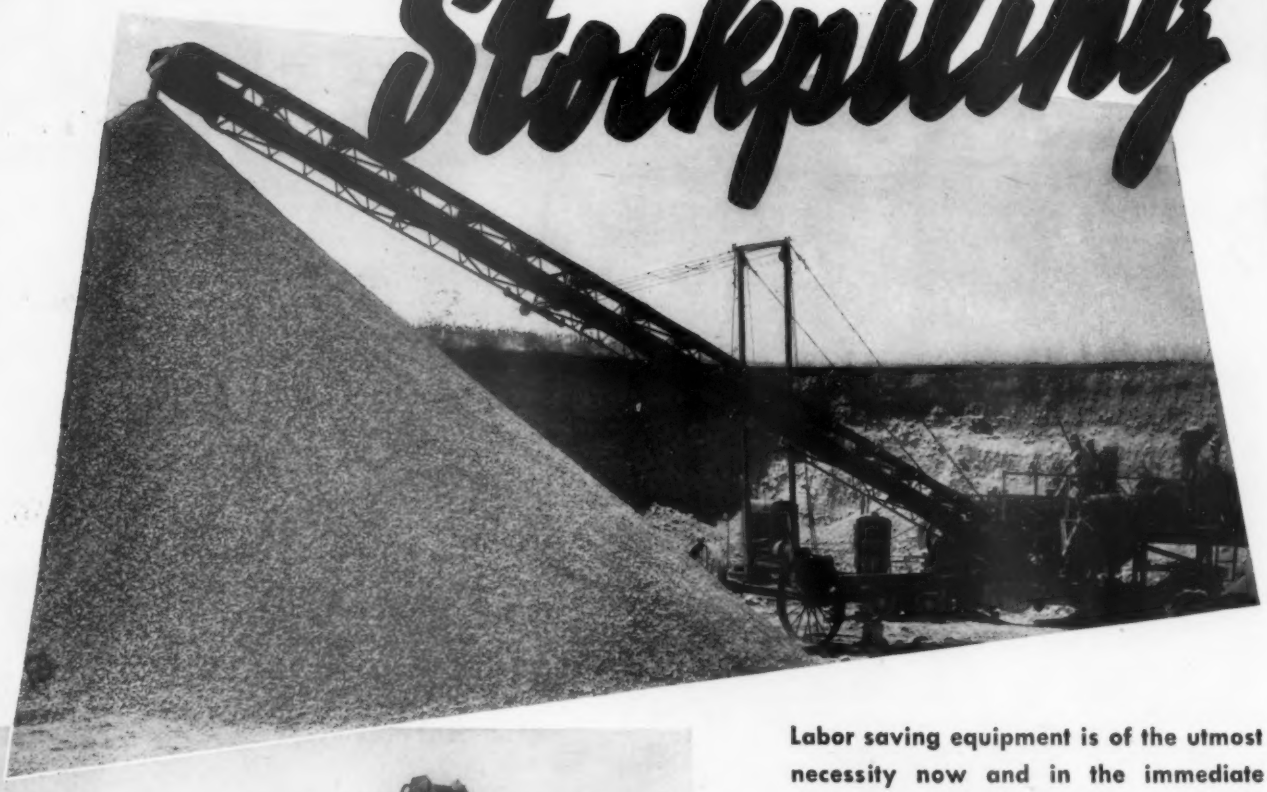
Stockpiling



Labor saving equipment is of the utmost necessity now and in the immediate months to come. To meet this need, WPB has released a limited schedule of Barber-Greene Model 82-A Bucket Loaders and Wheel Mounted and Permanent Belt Conveyors.

Preparation of aggregate and stock piling sized material is greatly facilitated with Barber-Greene Permanent and Portable Belt Conveyors. Reclaiming from stock piles is speeded up using the high capacity Model 82-A Bucket Loader, requiring less idle truck time. Often truck drivers easily fill in as loader operators loading their own trucks.

Barber-Greene engineers can assist you in utilizing your present equipment to its fullest advantage, as well as suggesting new equipment if it is necessary. Write to Sales Engineering Department, Barber-Greene Company, Aurora, Illinois, U.S.A.

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The CONCRETE MANUFACTURER

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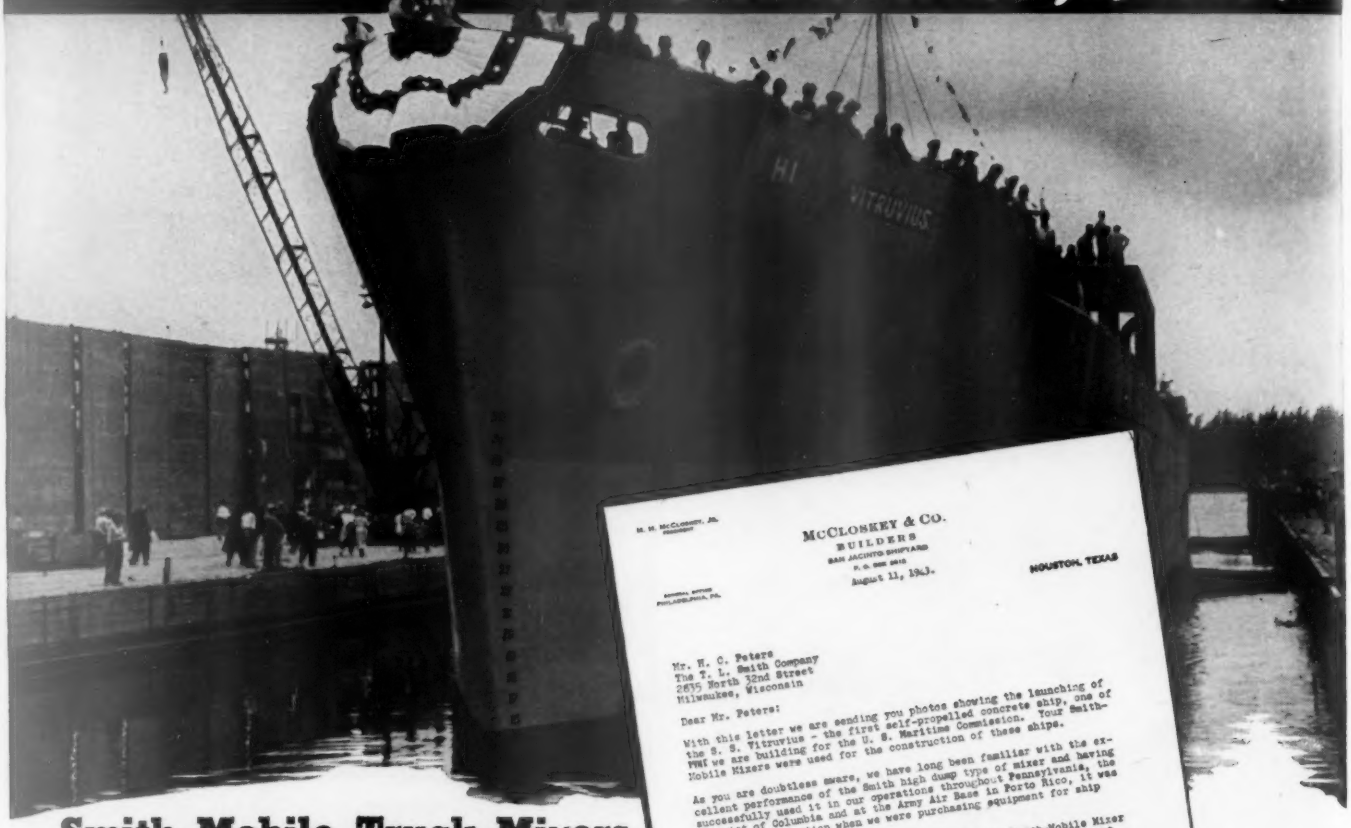

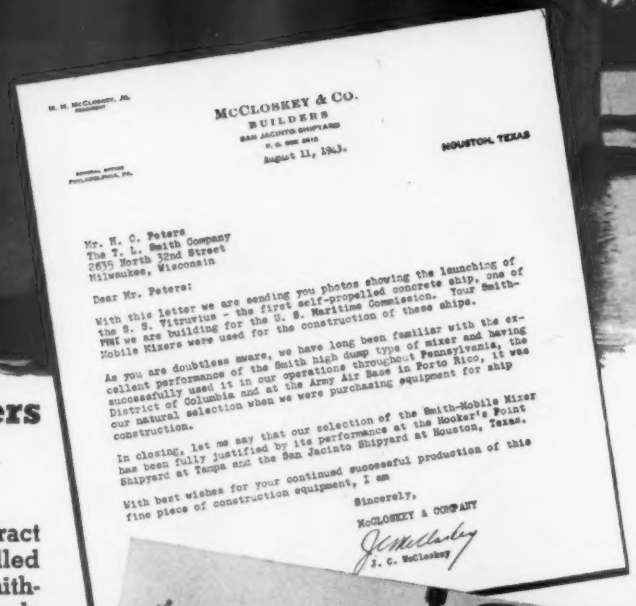

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PRESIDENT

GENERAL OFFICE
PHILADELPHIA, PA.

McCLOSKEY & CO.
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SAN JACINTO SHIPYARD
P. O. BOX 2610
HOUSTON, TEXAS

August 11, 1943.

Mr. H. C. Peters
The T. L. Smith Company
2835 North 32nd Street
Milwaukee, Wisconsin

Dear Mr. Peters:

With this letter we are sending you photos showing the launching of the S. S. Vitruvius - the first self-propelled concrete ship, one of FWM we are building for the U. S. Maritime Commission. Your Smith-Mobile Mixers were used for the construction of these ships.

As you are doubtless aware, we have long been familiar with the excellent performance of the Smith high dump type of mixer and having successfully used it in our operations throughout Pennsylvania, the District of Columbia and at the Army Air Base in Porto Rico, it was our natural selection when we were purchasing equipment for ship construction.

In closing, let me say that our selection of the Smith-Mobile Mixer has been fully justified by its performance at the Hooker's Point Shipyard at Tampa and the San Jacinto Shipyard at Houston, Texas.

With best wishes for your continued successful production of this fine piece of construction equipment, I am

Sincerely,

McCLOSKEY & COMPANY

J. C. McCloskey

Smith-Mobile Truck Mixers Help to Speed up Vital Shipbuilding Program

When McCloskey & Co. obtained the contract for building a large number of self-propelled concrete ships, they used their fleet of Smith-Mobile Truck Mixers for mixing the thousands of yards of concrete required. Past experience on big construction projects, convinced the company that this dependable truck mixer delivers rigid specification concrete, and does it on a fast production basis.

Operators invariably insist on having Smith-Mobile's HIGH DISCHARGE feature, the FEED CHUTE charging that really works, and VISIBLE MIXING that permits inspection of the entire batch before any of the concrete is discharged. It will pay you to get the complete Smith-Mobile story. Write for Catalog 198-B.

The T. L. SMITH CO., 2887 N. 32nd St., Milwaukee 10, Wis.

SMITH-MOBILE

The ORIGINAL HIGH DISCHARGE Truck Mixer and Agitator

A 4190-1P

Completely Equipped

SAND AND GRAVEL WASHING PLANTS

by ***COLUMBUS***

Above view shows one of the largest sand and gravel plants in southern Ohio. COLUMBUS supplied all the elevating and conveying machinery—COLUMBUS engineers supervised the layout and construction work.

COLUMBUS material handling equipment—from a single bucket to a complete plant—insures maximum value for durability, low cost operation and maintenance.

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WIRE ROPE DIVISION
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Primary Jaw Crusher, DIAMOND 24 x 36 with DIAMOND Apron Feeder.
Secondary Jaw Crusher, DIAMOND 10 x 36
Roll Crusher, DIAMOND 40 x 42
Main Vibrator, DIAMOND 2-deck, 4 x 12
Auxiliary Vibrator, DIAMOND 1-deck, 4 x 10
Bins, DIAMOND Jack Leg, 50 yard capacity
DIAMOND Belt Conveyors

DIAMOND STATIONARY PLANT NO. 3 (BOTTOM VIEW)
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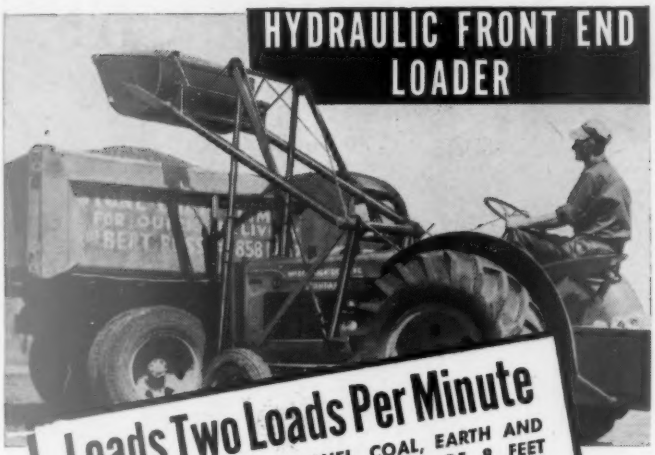

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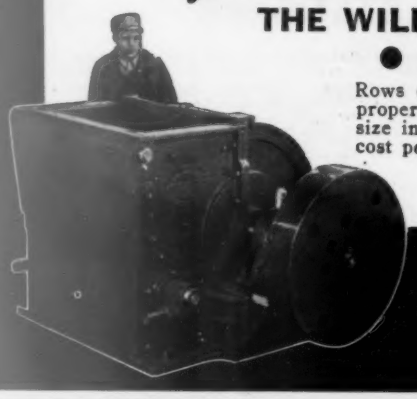

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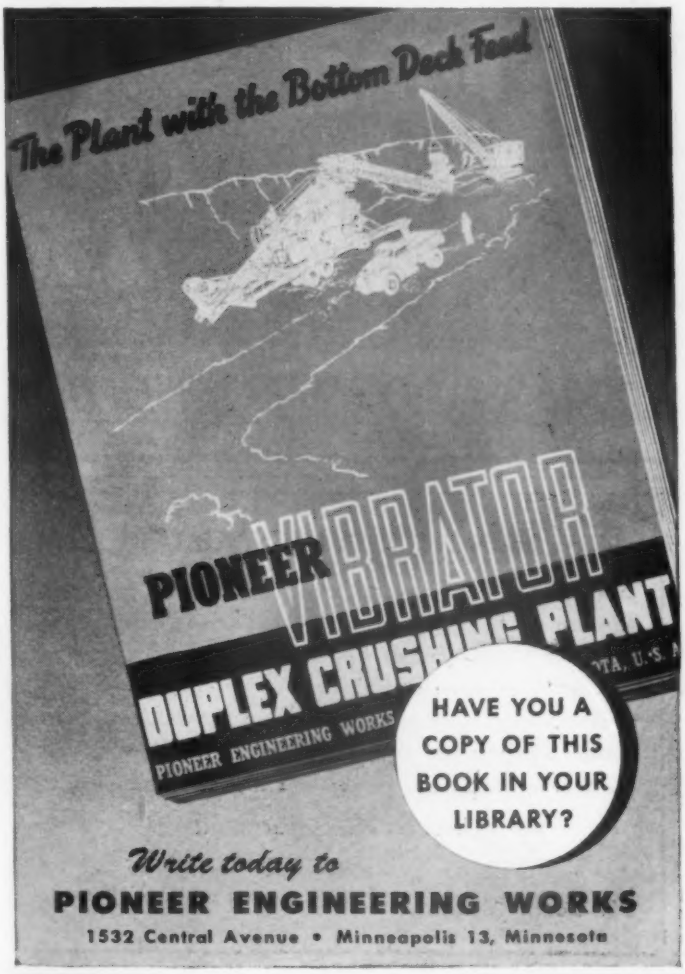
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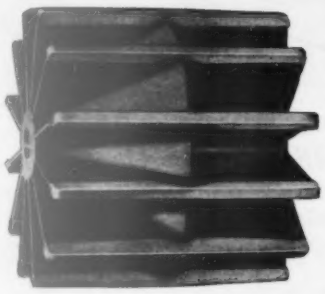

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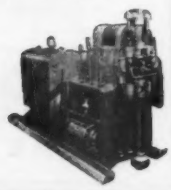

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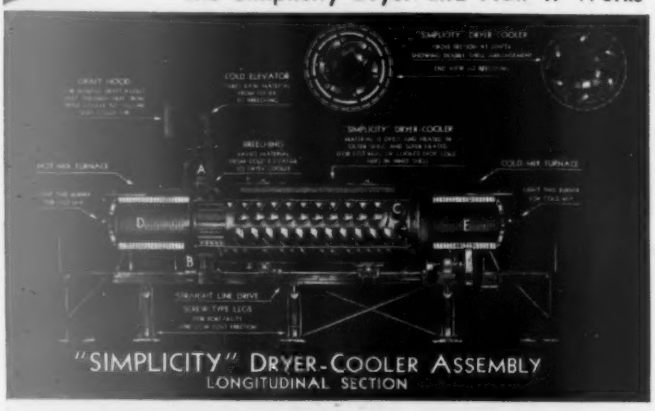

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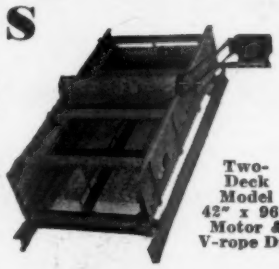

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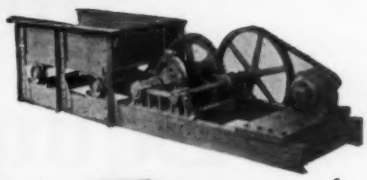

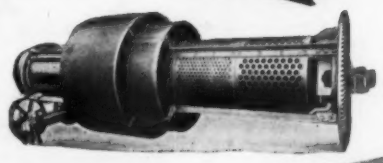

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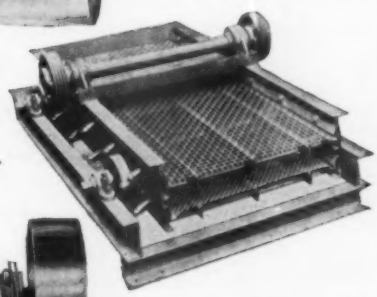

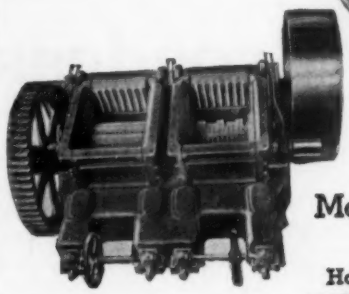

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1—10 x 90 ft., and others.

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Up to 55,000 bbls.

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DIESEL AND GENERATING EQUIPMENT
CEMENT MANUFACTURING EQUIPMENT

WEBBER EQUIPMENT CO.

New and Used Equipment
17 East 45th St., MU. 2-6511
New York 17, N. Y.

FOR SALE

1—Sullivan Angle Compound Compressor, WJ-3, Size 11—6¾ x 8, 350 CFM—P.D. with 50 HP electric motor, 3/60/220, and V belts. Excellent condition.

1—Ingersoll-Rand, Type ORC-3 steam driven compressor, 4384 CFM with Wheeler tube condensor. All excellent condition.

1—160 cu. ft. Gardner Denver portable gasoline engine driven air compressor thoroughly overhauled.

1—180 HP Anderson oil engine and generator.

•

Casellini-Venable Corporation
Barre, Vermont

CONCRETE MIXING PLANT

1—Complete modern Aggregate Plant, including 3 compartment Bins, 400 tons capacity, with scales; 1000 bbl. cement bin with scales; complete with all equipment; with or without three 1 yd. capacity, motor driven, Concrete Mixers; 440 volt, A.C.

CRUSHING PLANT

1—Complete Stone Crushing Plant, capacity 850 tons per day. Principal items are: 1—Farrel 25 x 36 Jaw Crusher; 1—Traylor 3' type TY, Reduction Crusher; 1—4 x 12 triple deck Screen; 1—long 24" Belt Conveyor and 1—short 18" Belt Conveyor; complete with steel Bins. Plant can be operated with electric motors, all of which electrical equipment is available, or can be operated with two 100 H.P. Diesel motors and one 50 KW Diesel Motor Generator Set. Plant all set up in working position; perfect condition throughout; immediate delivery.

CRUSHER SPECIALS

Allis Chalmers 7 x 12.
Universal 15 x 36.
Symons 2 ft. and 5½ ft.
Farrel 36 x 48.
Reliance 15 x 24.

KILNS

1—8' and 9'6" x 150'.
1—6' and 7' x 150'.
1—8' and 9'6" x 180'

LOCOMOTIVES SALE or RENT

1—Lima 80 ton, 6 wheel, Switcher with piston valve, with tender, superheater, code boiler, 200 lbs. pressure, electric lights, Walschaert valve motion, automatic lubrication; thoroughly modern, excellent condition, immediate delivery.

VIBRATOR FEEDER

1—Jeffrey-Traylor 6' x 6' with open pan deck, 6' 6' with 4—No. 5 heavy M-4 motors.

JAW CRUSHERS, GYRATORY CRUSHERS, ROLL CRUSHERS, DRYERS AND KILNS, HOISTS, CARS, CRANES, SHOVELS, ETC.

We will buy any modern piece of equipment anywhere.

LOG TYPE STONE WASHER

1—Allis Chalmers 25 ft. heavy duty, Hutch type, Log Washer, with steel tank, ⅝" plate, with 2 logs with paddles, 35" dia.

A. J. O'NEILL Lansdowne Theatre Building **Lansdowne, Pa.**
Philadelphia Telephone: Madison 8300

Mr. Operating Man: Mr. Traffic Man:

Your own owned CARS!

Demurrage, Avoidable Labor Expense, Extra.

What could **you** SAVE?

What increase in Production could **you** EFFECT?

Consider, also, benefits from MOBILE "Storage"!

Which of these cars could **you** use?

85, Hopper, Double, 50-Ton
10, Hopper, Side-Discharge, 50-Ton
9, Koppel, Side-Discharge, 24-Yd., 30-Ton
150, Refrigerator, 40-Ft., 40-Ton
16, Refrigerator, 36-Ft., 30-Ton
18, Ballast, Composite, 50-Ton
25, Box, 36-Ft., 40-Ton; Steel Ends
9, Dump, Western, Automatic, 20-Yd., 40-Ton
10, Dump, K & J Automatic, 16-Yd., 40-Ton
20, Flat, 40-Ft., 50-Ton
43, Gondola, Composite, 36-Ft. & 40-Ft., 40-Ton
10, Gondola, steel, 50-Ton, High-Side
30, Tank, 8000-Gallon, 40-Ton and 50-Ton

All cars are priced to sell!

IRON & STEEL PRODUCTS CO., INC.
39 Years' Experience
13490 S. Brainard Ave., Chicago 33, Illinois
"ANYTHING containing IRON or STEEL"

PLANT EQUIPMENT Rebuilt

No. 12 BEAUDRY CHAMPION POWER HAMMER

GODFREY LOADER 24' CENTERS Adjustable—Electric Motor Driven

100 ton WATSON STILLMAN HYDRAULIC JACKS

3½ CHISHOLM MOORE LOW HEAD CHAIN HOIST—Built In Trolley (New)

TYLER HUMMER SCREEN, Type 31 Electric, arranged for double deck

LARGE STOCK REBUILT ELECTRIC MOTORS, 1 to 200 HP

INLAND EQUIPMENT COMPANY
Successors to
THE WILLIAM W. NEWELL COMPANY
P. O. Box 477 Nashville 2, Tenn.

LOCOMOTIVE CRANES & LOCOMOTIVES

50 Ton Industrial Crane
35 Ton McMyler Crane
30 Ton Industrial Crane
25 Ton Browning Crane
15 Ton Ohio Crane
12 Ton Gas Crane
50 Ton Broad Gauge Crane
22 Ton Ohio Crane
20 Ton Electric Locomotive
18 Ton Gas Loco. S.G.
30 Ton Loco. Steam S.G.
25 Ton Loco. Steam S.G.
60 Ton Loco. Gas Elec. S.G.
40 Ton Loco. Steam S.G.
50 Ton Loco. Steam S.G.
57-67 Ton Loco. Saddle Tank
60 Ton Elec. Loco. Batt. Type S.G.
40-45-50 Ton Loco. All Elec. S.G.
65 Ton Switching Loco.
70 Ton Shay Geared Loco.
120 Ton Locomotive 0-8-0
50 to 75 Ton Stiff leg Derrick
25 Ton Gantry Crane, All Elec.

TRUCK CRANES

½ yd. Bear Cat
½ yd. Universal
½ yd. Bay City
½ yd. Orton

SHOVELS—CRANES—CRAWLERS

6 yd. Marion—Diesel—Dragline
⅜ yd. ¾ Swing Bay City Shovel
⅜ yd. ¾ Swing Insley Crane
½ yd. Browning Crane
½ yd. Osgood Crane
½ yd. Austin Crane
1¼ yd. McMyler Crawler Crane
¾ yd. Koehring—Dragline
½ Orton—Dragline
1 yd. P&H Dragline-Shovel No. 500
1¼ yd. Northwest Dragline No. 104
2 yd. Page Model 411 Walker
1¼ yd. Moore Speedcrane

TRACTORS

Cletrac "80" Gas and Diesel
Allis-Chalmers L with B/D "70"
Caterpillar "50" Diesel

MISCELLANEOUS

Car-Twin Hopper S.G. 50 Ton
2½ yd. Hayward Rehandler Clam. Bucket
4 yd. Hayward Rehandler Clam. Bucket
2 yd. Brownhoist Coal Handler Clam. Bucket

R. J. Stone **Ray S. Betham**

"STONE — the CRANE MAN"
502 Insurance Exchange Bldg., Detroit 1, Michigan
PHONES: Randolph 6156-4065

Due to my partner leaving for the Army, I have the following equipment for sale:

1—5 x 36 Universal Crusher
1—No. 3 Telsmith Gyrator Crusher
1—¾ yd. Orton Crane, 47 ft. boom
1—⅝ yd. Insley Excavator
1—¾ cu. yd. Koehring Shovel & Crane
1—Haiss Bucket Loader
1—¾ yd. Dragscraper outfit
1—¾ Electric Cableway
1—18 ton Winslow Scales
1—Portable Crushing Plant
3—Rotary Screens
3—18 x 36 Vibrating Screens
1—40 H.P. Upright Steam Boiler
2—6" gravel pumps
1—1942 Pontiac, Torpedo 8
1—Complete Austin Western Washing Plant

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IRVING BROS. GRAVEL COMPANY
Route No. 1, New Haven, Indiana

You are cordially invited to visit us at our new and enlarged headquarters at

225 WEST 34th STREET
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Let us thank you personally for your patronage and friendship.

Our latest bulletin of special offerings on request. Send us your inquiries and listings.

SPECIALS!

3—Mikro Pulverizers, Nos. 2TH, 2SI
2—Marcy No. 64½ Steel Lined Ball Mills, with steel balls
1—3′ Symons Cone Crusher
3—Allis-Chalmers Crushing Rolls, 36″ x 15″, 28″ x 15″
2—Blake Jaw Crushers, 10″ x 20″, 9″ x 15″
1—Single Roll Crusher, 18″ x 16″
2—Oliver 5′ x 8′, 8′ x 3½′ Rotary Filters
10—Bucket Elevators, 30′ to 75′ centers
8—Belt Conveyors, 20′ to 50′ centers
2—Vulcan Rotary Kilns, 7′ x 120′, 6′ x 60′
2—Vulcan 6′ x 42′, 4′ x 40′ Rotary Dryers
1—5 Roll High Side Raymond Mill, with motors and all accessories
4—Rotary Dryers 4′ x 30′ to 6′ x 64′
5—Tyler Screens, 3′ x 5′, 4′ x 5′
2—Jeffrey Type "A" Hammer Mills, 36″ x 24″, 24″ x 18″

BRILL EQUIPMENT COMPANX
225 WEST 24th STREET
NEW YORK 1, N Y.

U. S. Soldiers are tested under fire before they leave for the war front. **E.C.A.** construction equipment is tested under its own power before it leaves any of Equipment Corporation's rebuilding plants. It must pass by a wide margin because it is GUARANTEED.

LOCOMOTIVE CRANES

4—25 Ton Loco. Cranes, Browning & Industrial, oil fired, 40′, 45′ & 50′ booms.

1—15 ton Bucyrus Erie, coal fired, 40′ boom.

AIR COMPRESSORS

Portable and stationary, belt with elec., or gas power, sizes from 20 cu. ft. to 1,000 cu. ft.

CRANES AND SHOVELS

1—1¼ yd. Erie gas air Model GA2. Serial No. 9758, with 45′ boom and shovel attachment.
1—1¼ yd. P. & H. Model 650, Serial No. 4173, with 55′ boom & shovel attach.
1—1 yd. P. & H. Model 600, Serial No. 3502, 40′ boom, and backhoe attach.
1—¾ yd. Conco crane, Serial No. 1304, fully revolving, power 70 H.P. Continental gas engine, 30′ boom.
1—¾ yd. Koehring crane, Model 301, with 45′ boom, Serial No. 772. Gasoline powered.
1—¾ yd. P & H Model 400 crawler crane, Serial No. 4136, with 40′ boom gasoline powered.
1—½ yd. P & H shovel Model No. 204, Serial No. 2303, gasoline powered.
1—½ yd. Northwest No. 2, Serial No. 2908, comb. crane and shovel.
1—¾ yd. Erie Model B2 crawler crane, steam powered. Serial No. 4027, with 50′ boom and shovel attachment.

CRUSHERS

1—9x12″ Rogers jaw crusher (like new).
1—No. 4 Champion jaw crusher, size 9x15″, Serial No. 2606.
1—No. 2 Climax jaw crusher, size 9x16″.
1—Buchanan jaw crusher, size 10x16″.
1—Acme jaw crusher, Ser. No. 1873, size 12x20″.
1—Acme jaw crusher, Ser. No. 1686, size 9x16″.
1—United Iron Works "Blake-type" jaw crusher, size 9½x24″.
1—Allis Chalmers, No. 5 gyratory crusher, Ser. No. 5331, opening 10x38″.
1—Austin No. 5 gyratory crusher, Ser. No. 2945, opening 12x35½″.

DERRICKS

3—Steel Guy Derricks; 1—20 ton American steel derrick, 110′ mast; 100′ boom; 1—5 ton Terry Guy Derrick, 70′ mast. 60′ boom; 1—5 ton Insley, 75′ mast. 80′ boom. Stiff leg derricks; 1—25 ton Hunter, 40′ mast, 80′ boom; 1—2 ton Pittsburgh, 26′ boom, 15′ mast. Also a number of wood stiff leg derricks, 1 to 5 ton cap.

HOISTS (Electric, Gas, Steam)

85—Electric, ranging from 20 H.P. up to 125 H.P., consisting of triple-drum, double-drum and single-drum, with AC or DC motors, some with attached swingers. Following makes: American, Clyde, Lambert, Lidgerwood and National.
Gas hoists ranging from 8 to 120 H.P., single, double and triple-drums; all standard makes (38 in stock).
Steam, ranging from 8 H.P. to 60 H.P., single, double and triple-drum; all standard makes.

LOCOMOTIVE CRANE

1—15-ton Bucyrus Erie locomotive crane. Serial No. 233, with 40′ boom, steam powered. Equipped with air brakes. Thoroughly REBUILT. Cap at a 12′ radius and a 2 part line, 30,000 lbs. Boiler vertical size 54″x7′6″. Shipping wt. 87,500 lbs.

PUMPS (Dredging)

1—10″ Morris sand pump, Ser. No. 868€4, cap. 87 cu. yds. per hr.
1—8″ Cataract dredging pump, Ser. No. 175895, cap. 2000 GPM @ 53′ head.
1—8″ Morris cent., sand pump, cap. 60 cu. yds. per hr.

PNEUMATIC TOOLS

A large quantity of Jack hammer drills, column tripod and derrick drills.

PARTIAL LIST ONLY — SEND FOR 48 PAGE STOCK LIST

All this equipment is owned by us and may be inspected at one of our plants. WE BUY—REBUILD, SELL AND RENT.

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P. O. Box 933
Dept. PQ

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1513 Race St.
NEW YORK 7, N. Y.
30 Church St.
Dept. PQ

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PIPE New & Reconditioned

ALL SIZES for ALL PURPOSES
Cut and Threaded to Your Specifications
VALVES AND FITTINGS
UNITED PIPE & SUPPLY CO., NORRISTOWN, PA.

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2 HAMMERMILLS, Universal No. 3, capacity 25-35 tons aglime per hour; good as new; guaranteed; also 4 used 125 HP Waukesha Power Units.

CONTRACTOR
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Tel. — L. D. 121

LOADER FOR SALE

Barber-Greene Model 25-A crawler gas operated disc type bucket loader, capacity ¾ to 1 yard per minute. Overhauled, ready for work.

THE ACME EQUIPMENT COMPANY
14057 Schaefer Highway
Detroit 27, Michigan

FOR SALE

CLAMSHELL BUCKETS

5/8 yd. Blaw Knox, No. 606	525.00
7/8 yd. Blaw Knox, No. 611	550.00
1 1/4 yd. Blaw Knox, No. 616	650.00
3/4 yd. Erie "Peerless"	625.00
1 yd. Erie "Peerless"	625.00
1/2 yd. Owen, Type M	550.00
3/4 yd. Owen, Type K	650.00
1 yd. Owen, Type K	750.00
1 yd. Owen, Type M	650.00
1 yd. Lakewood, Rehandler	400.00
1 yd. Williams, Type PF	625.00

CRUSHERS

9x16 Cedar Rapids Jaw Crusher	800.00
8x24 Universal Jaw Crusher mounted on steel truck, 24' bucket elevator	1375.00

MIXER

Koehring No. 20, LeRoi Engine	550.00

Write us for Rebuilt Equipment.

YATES MACHINE WORKS
Rochester 1, Michigan

FOR SALE

Model M Northwest Dragline with 1½ Yd Page Bucket
60A Lorain 1 Yd Shovel & Crane Gas
Badger ½ Yd Shovel Gas ¾ Swing A-W
3—8 Yd Koehring Gas Rubber Tired Scrapers
3—10 Yd Gas Bot Dump Rubber Tired Euclids
1½ Yd Sauerman Elec Slackline Complete
4 Deck 4' x 8' Diester Vib Screen Complete
3 Deck 4' x 6' Diester Vib Screen Complete
24" x 30" Stedman Impact Crusher
18" x 30" Greenville Roll Crusher
#8 Kennedy Gyr. 17" x 36" Opening
60' Center Elevator 30" x 12" Buckets
Standard R.R. Track Scale 225 Tons
2 Drum Am H & D Hoist 1½ Yd Sauerman Dragscraper Bucket and Cables
2000' O Waterproof Power Line
Heltzel Three Comp. weighing Batchers and Kron Scales
1939 Ford Tractor with Kingman 4 Wheel Trailer
4" x 40" A-W Roller Bearing Jaw Crusher

Many Other Good Equipment Units.
LET US KNOW WHAT YOU WANT.

WE WILL LIST AND ADVERTISE YOUR IDLE EQUIPMENT WITHOUT COST TO YOU. SEND US LIST WITH DESCRIPTION AND PRICES.

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The T. J. Lane Company
Ph. 2-3362, Springfield, Ohio, Box 665

WANTED

4 3 x 6 to 4 x 10 2 and 3 Deck Vibrating Screens

2 24 or 36" Plate Feeders

2 Live Roll Grissleys

BESTER-LONG COMPANY
Hagerstown, Maryland

AERIAL TRAMWAY
Purchased from American Steel & Wire Co.
Length—400 feet station to station.
Cable—485 feet long, anchor to anchor.
1¾" diameter—L. C. Round.
Bucket—43 cu. ft. capacity—single reversible—move 65 tons per hour.
Tower—80 feet high.
Price at Pequannock, New Jersey, on request.
FRANKLIN CONTRACTING COMPANY
20 Washington Place Newark, N. J.

BUCKET ELEVATORS

Enclosed 12", 14", 16" bucket elevators to 120'
Enclosed 10" bucket elevators to 88'
Enclosed 8" bucket elevator 40'
Enclosed 6" bucket elevator 32'
Open 16" bucket elevator on chain, 50'
Open 18" bucket elevator on belt, 40'
Open 20" bucket elevator on 9 ply belt, 52'
Continuous 14" bucket elevator, 50'
Continuous 30" bucket elevator, 35'
New 9 ply rubber covered 22" elevator belt
Used 6 ply 20" wide elevator belt
Gears, sprockets, take-up bearings and chain
Barrel elevator with curved arms on chains

CONVEYORS

36"x175' trough belt conveyor with 6 ply belt
86' new 54" wide 5-7 ply conveyor belt
36" and 14", 6 ply conveyor belt
30" new 4 ply conveyor belt, ⅛" and 1/32" tops
Selected belt conveyor parts
Single Strand Flight conveyor, 15"x100'
Jeffrey Foundry Mold conveyor, 42"x150'
Jeffrey Standard Steel Apron Feeder, 24"x60'
Six belt trippers from 14" to 30" wide
Steel Plate Package Carrier, 24"x20'

CRUSHERS, ROLLS, MILLS

Farrel 20"x6" B jaw crusher
Buchanan 16"x10" jaw crusher
Acme 18D 18"x32" jaw crusher
New England 11"x20" jaw crusher
Reliance 8"x14" jaw crusher
Traylor 11" Bulldog gyratory crusher
Robins double roll spiked coal crusher, 24"x30"
Stevenson single roll crusher, 24"x39"
Single roll spiked, coal crusher, 24"x24"
Simplex Unit Pulverizer, roller bearings
American Standard Disintegrator, 24"
Sturtevant Rotary Fine Crusher, No. 0
Williams Hammermill No. 2
Double roll crusher, 16"x16"

SCREENS, WASHERS

Two Hummer single deck 3'x5' vibrating screen
1 Hummer single deck 4'x5' vibrating screen
Tylers 15 cycle generators for Hummer screens
New "TONCAP" cloth, framed, 3x5 and 4x5
Revolving screens: 42"x18', 4'x16', 5'x20'
JIGGER 3 deck 2'x5' vibrating screen

STONE WORKING EQUIPMENT

2 Meyers Stone saws, 60" and 48" diameter
2 Lincoln 42" open side planers, electric
1 Lincoln 36" open side planer, electric
1 Patch 36" open side planer, belt driven
2600# of steel tools for planers
Electric air compressor unit, 49 Ft.

MISCELLANEOUS

Chicago air compressor with 100 hp motor, 529'
Schramm air compressor with 60 hp motor, 360'
Ing. Rand air compressor with gasoline engine
Mang. lined 6" sand pump with 75 hp motor
Worthington 4" centr. pump with 25 hp motor
Electric, gasoline and belt driven pumps
8 ton gasoline locomotive, 36" gauge
Mercury 1½ ton battery locomotive, 30" gauge
V shaped 36" gauge 2 yard dump cars
Flat cars, 24" and 20" gauge; turntables
Enclosed 25 hp new angle drives, roller bearings
12" and 16" screw conveyors with U troughs
V drive pulleys and belt, 400 hp

G. A. UNVERZAGT & SONS
136 COIT ST. IRVINGTON, N. J.

FOR SALE

1—5-yard Dipper & Sticks for 120B Bucyrus Shovel

1—Buckeye Traction Ditcher, Ladder type,—digs 18' deep

1—Heavy-duty Single-drum Steam Hoist, 300 HP with 200# Boiler, large Brakes

3—18 x 10 x 12 Duplex Steam Jetting Pumps

Sundfelt Equipment Company
3422 First Avenue South
Seattle 4, Washington

FOR SALE

1—Complete Rotor-lift portable crushing and screening plant with 15 x 24 jaw crusher, roller bearing, 26 x 20 roll crusher, power unit, 12 pneumatic tires, weight of plant complete — 55,200 lbs. Plant in excellent condition. Priced for immediate sale.

2—30 cu. yd., 3 compartment steel jack leg bins. Have been in use 15 months.

1—Continuous bucket elevator, 30' centers complete.

1—13" Style "K" Gates gyratory crusher. New Manganese concaves. Excellent condition.

¾ yd. ERIE STEAM SHOVEL, completely rebuilt and reconditioned.

RIVERVIEW STONE & MATERIAL CO.
Box 44, Baden Station, St. Louis (15), Mo.
Telephone: TErryhill 6-3511

GOOD USED EQUIPMENT

NORTHWEST #5 Cat. Crane, 50' boom, 1⅛ yard Page Medium Bucket
KOEHRING ¾ yard Cat. Crane, 40' boom
NATIONAL 10-ton Single Drum Winch, arranged for direct motor drive.
CLADWELL Car Puller, motor drive.
60 HP Westinghouse type SK motor, 230 volts DC, speed 680 RPM's.
200 HP Westinghouse type CW Variable Speed Induction Motor, 440 volts, 3 phase 60 cycle with starter.

• • •

IRA C. JORDAN
2508 East Belleview Place
Milwaukee, Wisconsin

FOR SALE

Used only on one job

Six Practically New 3 cubic yard Rex Horizontal type Truck Mixers mounted on Late Model Heavy Duty Trucks

also

One—Two cubic yard Ransome Truck Mixer mounted on Mack truck.

All equipment in A-1 condition.

Priced to sell

J. A. NICHOLSON

4090 Detroit Avenue TOLEDO, OHIO LAwndale 1185

FOR SALE—Red Wing Marine Gas Motor, also Hetherington and Berner 8 inch sand and gravel pump. Priced to sell—In excellent condition.

MAUMEE RIVER SAND AND GRAVEL CO.
NAPOLEON, OHIO

1½"—1¼"—1⅛"—1" and ⅞" Plow and IMPROVED PLOW STEEL WIRE ROPE; 6 x 7 and 19 construction; hemp and WIRE Centers; New and slightly used, EXCELLENT; for Drag lines, Dredging, Inclines, Hoisting, etc.; 60" and 48" Heavy Rubber Conveyor Belts; Steel TANKS; Diesel and Uniflow Engines, with and without GENERATORS; 50 to 250 HP. Economic, Upright and Locomotive Type Boilers; HIGH and low pressure; 500 KW Steam Turbo Generator; CONDENSING; Above located in Middle West, and in the East.

BOX 610
538 So. Clark Street, Chicago 5, Illinois

DEPENDABLE USED MACHINES

Special, — Pioneer duplex portable gravel plant, 9x36 primary pneumatics.

15 ton bin	P&H ⅝ yd. crane	Weller sand tank
Cat 30 bulldozer	P&H 700 crane & shovel	Niagara 3x12 screen
Conveyors, many sizes	Iowa 10x20 crusher	Single deck 3x5 screen
Conveyor idlers & parts	Day 18 in. hammermill	Thew 1 yd. shovel
Browning ⅝ yd. crane	Link Belt loader	Cat 65 HP Diesel tractor
Link Belt ¾ yd. crane	Barnes 4 in. pump	5 ton truck crane

3506 W. 51st Street TRACTOR & EQUIPMENT CO. Chicago, Illinois

FOR IMMEDIATE DELIVERY OF RUBBER PRODUCTS

Conveyor Belting...Transmission Belting...Elevator Belting...Fire, Water, Air, Steam, Suction or Welding Hose, etc.

CALL, WIRE or WRITE
CARLYLE
THE RUBBER HEADQUARTERS

CARLYLE RUBBER PRODUCTS ARE NEW, GUARANTEED & LOW PRICED

CONVEYOR BELTING

ABRASIVE RESISTANT COVERS

Width	Ply	Top-Bottom	Covers
48"	8	1/8"	1/16"
42"	5	1/8"	1/16"
36"	6	1/8"	1/16"
30"	6	1/8"	1/16"
30"	5	1/8"	1/16"
24"	5	1/8"	1/32"
24"	4	1/8"	1/32"
20"	5	1/8"	1/32"
20"	4	1/8"	1/32"
18"	4	1/8"	1/32"
16"	4	1/8"	1/32"
14"	4	1/16"	1/32"
12"	4	1/16"	1/32"

Inquire For Prices - Mention Size and Lengths

TRANSMISSION BELTING

HEAVY-DUTY FRICTION SURFACE

Width	Ply	Width	Ply	Width	Ply
18"	6	10"	6	6"	5
16"	6	10"	5	5"	5
14"	6	8"	6	4"	5
12"	6	8"	5	4"	4
12"	5	6"	6	3"	4

Inquire For Prices - Mention Size and Lengths

ENDLESS "V" BELTS

"A" WIDTH All Sizes | "D" WIDTH All Sizes
"B" WIDTH All Sizes | "E" WIDTH All Sizes
"C" WIDTH All Sizes | Sold in Matched Sets

Inquire For Prices - Mention Size and Lengths

PROTECT THAT PLANT
FIRE HOSE

APPROVED SPECIFICATION HOSE
EACH LENGTH WITH COUPLINGS ATTACHED

Size	Length	Per Length
2½"	50 feet	$28.00
	25 "	16.00
2"	50 "	23.00
	25 "	13.00
1½"	50 "	20.00
	25 "	11.00

Specify Thread On Couplings

SPECIAL OFFER . . . HEAVY DUTY
RUBBER HOSE

WATER HOSE
Each Length with Couplings Attached

I.D. Size	Length	Per Length
¾"	25 feet	$4.25
1"	50 "	8.00
	25 "	6.25
1¼"	50 "	12.00
	25 "	7.50
	35 "	10.50
	40 "	12.00
1½"	50 "	15.00
	25 "	10.00
	35 "	14.00
	50 "	20.00

AIR HOSE

I.D. Size	Length	per Length	Couplings
½"	25 feet	$5.00	$1.50 Pair
	50 "	10.00	1.50 "
¾"	25 "	6.25	2.50 "
	50 "	12.50	2.50 "
1"	25 "	10.00	3.50 "
	50 "	20.00	3.50 "

LARGER SIZES ALSO AVAILABLE
All Prices—Net—F.O.B. New York

CARLYLE RUBBER CO., INC.
62-66 PARK PLACE NEW YORK, N. Y.

SHOVELS—CRANES
Koehring 502, 1¼ yd. Shovel—Crane—Dragline
Koehring 401, 1 yd. Shovel—Crane—Dragline
Lorain 75B, 1½ yd. Shovel, gas, Rebuilt
Lorain 75A, 1¼ yd. Shovel, gas
Buc.-Erie 50B, 2 yd. Stripping Shovel, steam
Mead-Morrison 9 Ton Truck Crane
Moore Speedcrane 15 tons, gas, 65' boom
Bucyrus Erie Model 1030 Electric Tunnel Shovel
Koehring 301 Shovel & Crane, ¾ yd.
Marion 37, 1¾ yard Steam Shovel
Lorain 40, ¾ yd. Crane, gas
Lorain 30 Shovel, Crane, & Backhoe, rebuilt
Bay City ½ yard Shovel, gas
Ohio Diesel Locomotive Crane 22½ tons

SPECIALS!!
Allis-Chalmers cent. pump, electric, 3500 GPM, 50'
Worthington 8" cent. bronze impeller, elec. Pump
Butler 16 cu. ft. Asphalt Pug Mill

BUCKETS—STONE SKIPS
⅞ yd. Blaw-Knox Clamshell, digging
⅞ yd. Hayward Clamshell, digging
Hayward ¾ yd. Standard Orange Peel
⅝ yd. Williams Clamshell, digging
½ yard Haiss Clamshell, rehandling
¾ yard Haiss Clamshell, rehandling
Erie ¾ yd. Clamshell, rehandling
Owen Stone Grapple

TRACTORS—BULLDOZERS
Allis Chalmers LO with bulldozer, rebuilt
2 Cletrac FD Tractors with bulldozers
Heil 12 yard Scraper
TD 9 Tractor with bulldozer
TD 40 Tractor with bulldozer
Allis Chalmers L Tractor with Baker bulldozer

CRUSHERS—CRUSHER PLANTS
Gyratory Crushers: K.V.S. 30, 37-S, 49; Traylor 8"; McCully 13", 8", 6"
Jaw: 10x22, 10x24, 11x18, 12x24", 14x24", 16x32
Complete Rock Crushing Sand & Gravel Plants

LOCOMOTIVES—CARS
American 60 ton, steam, std. ga.
American 50 ton, steam, Saddle Tank
American 45 ton, Saddle Tank
Plymouth 45 ton, Diesel, std. gauge
Vulcan 30 ton Steam, Saddle Tank
Vulcan 20 ton, gas, std. gauge
Whitcomb 14 ton, Diesel, 36" gauge
Porter 13 ton, Steam Saddle Tank, 36" gauge
Davenport, 10 ton, std. gauge locomotive
Baldwin Westinghouse 8 ton, 36" ga. Battery
Vulcan 8 ton std. gauge, gas
Vulcan 6 ton, 36" gauge, gas
3—Western Steel 20 yard Air Dump Cars
3—30 ton Standard Gauge Flat Cars, rebuilt

CONCRETE PLANT & EQUIPMENT
2—Ransome 28S Mixers on skids, left and right hand
Blaw-Knox 750 bbl. 2 compt. Cement Bin
Heltzel 85 ton, 3 compt. Steel Bin, weigh batcher
Blaw-Knox 100 ton, 3 compt. Aggregate Bin with 300 bbl. Bulk Cement Bin, with electrical interlocking

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30 Church St. New York, N. Y.

FULLY REPAIRED LOCOMOTIVE

Available Immediate Delivery

0-4-0 Saddle Tank—32½ tons
Standard Gauge
Built 1917
Boiler ASME
Tractive Effort 14,400 lbs.
Location: Cincinnati, O.
Also—Hopper, Gondola, Flat, and Box Cars

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Gyratory, Jaw, Single and Double Roll, & Cone Crushers various makes and sizes.
Two Jeffrey Vibrating Pan Feeders.
Stephens-Adamson 42" x 21' Apron Feeder.
1 yard Northwest 104 Dragline 55' boom.
50 HP National Drag Scraper Outfit complete.
54" dia. x 40' & 6' x 28½' Rotary Dryers.
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200 and 400 KW. 250 volt DC Generators, DC to Steam Engines, One Uniflow.
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250 CFM Sullivan Belted Air Compressor.
Cars, Elevators, Screens, Conveyors, Motors.

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Crushing Rolls—16"x10" up to 54"x24".
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New Dryers built for all purposes.

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Very attractive price.
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Dundee, Illinois

3—Kohler 1500W, 110V, DC, Universal 4KW, 125V.
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1—2024 Dixie RB Hammermill, factory built 4 st. wheel truck, folding elevator, recond.
9x16" RB Jaw crusher V-belt 4 cyl. gas engine on factory built 4 st. wheel truck, recond.
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1—16" x 36" Style "B" Allis Chalmers Crushing Rolls—First Class Condition.
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Farrel 36" x 15" B Jaw Crusher, complete with Motor and Drive. Motor 60 H.P. Slip Ring, 220 V., 3 ph., 60 C. Drive V-Flat with Ropes.

Condition Excellent—Price Low

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936 Cedar Rapids plain bearing crusher, serial No. 3445, V-belt driven by 2 piece splined, extended shaft with bearings and universal joint for connection with power take-off on tractor; with 12' 24" belt discharge conveyor, shaft driven; all mounted on all-steel four wheel trailer truck, steel tired wheels with 14" faces and heavy tractor towing tongue withdraw-bar clevis. Weight—16,000 lbs. Good condition throughout. Located at our yard.

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Motor Truck Scales.....$440.00
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New—Immediate Delivery
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2—"60" Caterpillar Bulldozers
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Let us know if you have any shovels, cranes, draglines, boilers or any other construction equipment for sale.

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Second hand Allis Chalmers Ball Mill, Williams Hammer Mill, Link Belt Elevators and conveyor. Roller bearing end dump mine pit cars. Link Belt coal crusher. Storage bins. Marion Steam Dragline at phosphate plant 55 miles from Nashville, Tennessee.

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2 or 2½ or 3 yard stripping shovel, Diesel or Electric, long reach, must be first class condition. Preferably located in Ohio or vicinity. D-7 Caterpillar Tractor with bulldozer or angledozer. First class condition or rebuilt and guaranteed.

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One heavy duty, six to eight cubic yard dragline bucket with digging teeth.

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GOOD VALUES — ALWAYS

24 x 18" American Hammermill & Power Unit.
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Caterpillar Diesel Tractor & Bulldozer—70 HP.
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24" x 54" Superior Crushing Rolls

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300 GPM, 50' head American Well Works, 1750 RPM, complete with 7½ H.P. motor

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60,000 gallon Water Tank on 89'9" tower with 10" riser pipe

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7, 7½ cu. yd. Allis Chalmers SPEED-ACE. In excellent condition. Write for illustrated bulletin.

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1—New LeRoi Model 105, gas engine driven, on 2-wheeled trailers.

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4—New Marlow 1½", 3,000 GHP, self-priming, centrifugal force Pumps.

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17—Rebuilt Yale and Towne, 1-ton Chain Hoists, like new.

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Used only on one job

Six Practically New 3 cubic yard Rex Horizontal type Truck Mixers mounted on Late Model Heavy Duty Trucks

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One—Two cubic yard Ransome Truck Mixer mounted on Mack truck.

All equipment in A-1 condition. Priced to sell

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8—1942 Model Jaegers—High discharge, separate engine drive with two-speed transmission. 4 mounted on 1942 Dodge six wheelers tandem drive, good rubber, excellent condition.

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1—Telsmith Pulsator Screen
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1—936 Cedar Rapids Jaw Crusher
1—3 Ft. Symons Cone Crusher
1—15x36 Universal Jaw Crusher
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6x8 Continuous Pebble Mill.
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14 ft., 8 ft. and 12 ft. Separators

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18 in., 24 in., 30 in., 36 in. and 48 in. Symons Disc.
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5—1 yd. 2 yd. & 3 yd. Mixers.
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60 HP Fairbanks Morse.
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5 Roll High Side.

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50000 gal. on 100 ft. tower.
60000 gal. on 85 ft. tower.
100000 gal. on 100 ft. tower.

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12—50 Ton Cap. Battleship Gondolas.
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1—¾ yd. Gas 1—1½ yd. Electric
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R. R. TRACK SCALE
125 Ton 56' x 10'6" Platform 4 Section.

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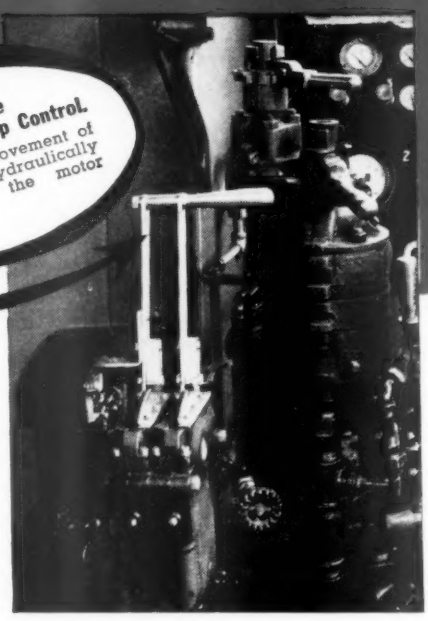

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